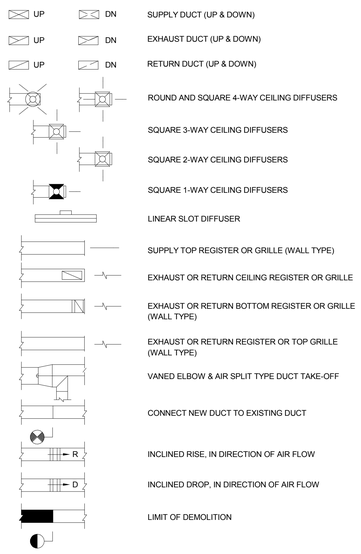
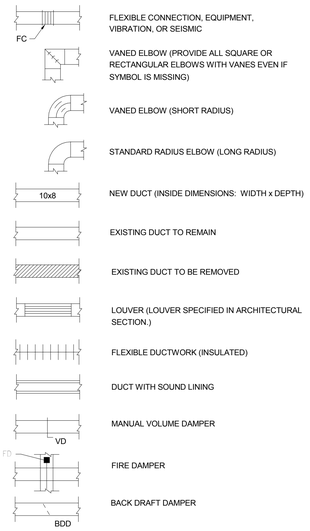
ABBREVIATIONS

A/E	ARCHITECT / ENGINEER
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AHU	AIR-HANDLING UNIT
AMP	AMPERGE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
AS	AIR SEPERATOR
ATM	ATMOSPHERIC
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BHW	HOT WATER HEATING BOILER
BMS	BUILDING MECHANICAL SYSTEM
BT	BUFFER TANK
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CENTIGRADE (CELCIUS)
CD	CONDENSATE
CD-1	CONSTRUCTION DOCUMENTS
CD-2	CONSTRUCTION DOCUMENTS
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFT	CUBIC FEET
CG	CEILING GRILLE
CH	CHILLER
CHW	CHILLED WATER
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CM	CARBON MONOXIDE
CO2	CARBON DIOXIDE
CR	CEILING REGISTER
CU	CONDENSING UNIT
CV	CONSTANT VOLUME
CVE	CONSTANT VOLUME EXHAUST
CVS	CONSTANT VOLUME SUPPLY
D	DAMPER - AUTOMATIC
D-1	OUTDOOR AIR DAMPER
D-2	RETURN AIR DAMPER
D-3	RELIEF AIR DAMPER
DB	DECIBELS
Db	DRY-BULB TEMPERATURE
DCW	DOMESTIC COLD WATER
DD-1	DESIGN DEVELOPMENT
DD-2	DESIGN DEVELOPMENT
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DF	DIFFUSER
DIA	DIAMETER
DP	DEW POINT TEMPERATURE
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
ECC	ENGINEERING CONTROL CENTER
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ENT	ENTERING
ER	EXHAUST REGISTER
ERC	ELECTRIC REHEAT COIL
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EU	EVAPORATOR UNIT
EX	EXISTING
F	FAHRENHEIT
F/SD	COMBINATION FIRE SMOKE DAMPER
FACP	FIRE ALARM CONTROL PANEL
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
FV	FACE VELOCITY
GA	GAUGE
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HP	HORSEPOWER
HPDT	HIGH PRESSURE DRIP TRAP
HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)
HW	HOT WATER
HWC	HOT WATER COIL
HWHC	HOT WATER HEATING COIL
HWP	HOT WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HZ	HERTZ
I/O	INPUT/OUTPUT
IN	INCHES
IN WC	INCH WATER COLUMN
LPSS	LOW PRESSURE STEAM SUPPLY (ATMOSPHERIC)
MIN	MINIMUM
NA	NOT APPLICABLE
NC	NOISE CRITERIA
NOM	NOMINAL
OA	OUTSIDE AIR
PD	PRESSURE DROP
PSI	POUNDS PER SQUARE INCH
R/E	RETURN OR EXHAUST
RA	RETURN AIR
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SD	SMOKE DAMPER
SD	SUPPLY AIR DIFFUSER
SG	SUPPLY AIR GRILLE
SP	STATIC PRESSURE
SQ FT	SQUARE FOOT (FEET)
T	THERMOSTAT
TAB	TESTING, ADJUSTING, BALANCE
TD	TEMPERATURE DIFFERENCE
TEFC	TOTALLY ENCLOSED FAN COOLED
TSP	TOTAL STATIC PRESSURE
TU	TERMINAL UNIT
UH	UNIT HEATER
V	VALVE
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
VFD	VARIABLE FREQUENCY DRIVE
VHA	VETERANS HEALTH ADMINISTRATION
VI	VIBRATION ISOLATOR
YR	YEAR

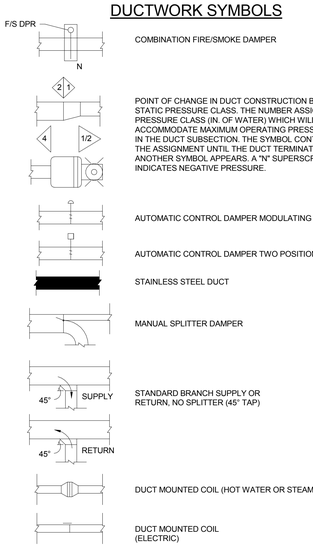
DUCTWORK SYMBOLS



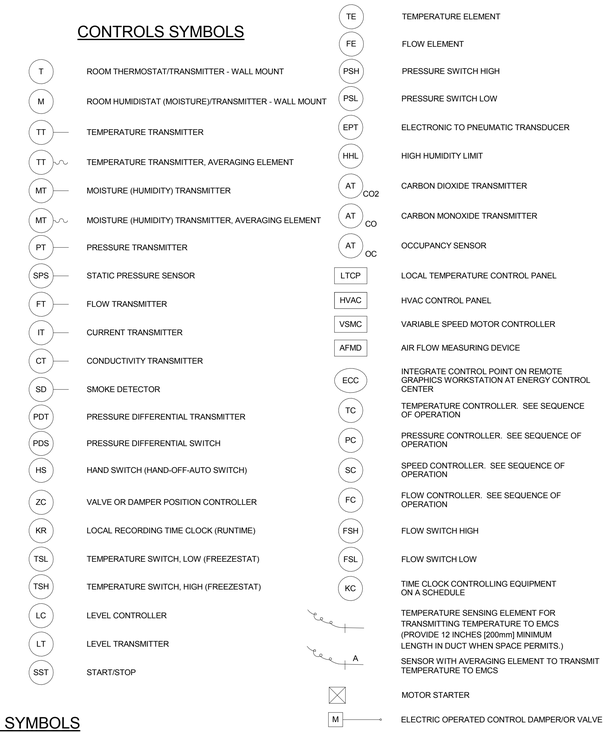
DUCTWORK SYMBOLS



DUCTWORK SYMBOLS



CONTROLS SYMBOLS

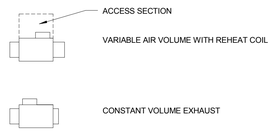


GENERAL NOTES

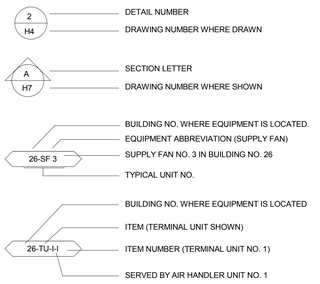
1. COORDINATE WITH OTHER DISCIPLINES AND RESOLVE ANY INTERFERENCES PRIOR TO INSTALLATION.
2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.
3. REFER TO ARCHITECTURAL ELEVATION DRAWINGS FOR LOCATION OF WALL MOUNTED MECHANICAL ITEMS.
4. ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN A FURRED CHASE OR ABOVE THE HARD OR SUSPENDED CEILING.
5. LOCATE ALL VALVES, TRAPS, DAMPERS, CLEANOUTS, CONTROLS, ETC. ABOVE ACCESSIBLE CEILINGS, OR PROVIDE ACCESS PANELS. MINIMUM ACCESS DOOR SIZE SHALL BE 18x18 UNLESS OTHERWISE APPROVED BY ENGINEER. ACCESS PANELS SHALL BE FURNISHED AND INSTALLED UNDER THE ARCHITECTURAL SPECIFICATIONS. LABEL VALVES AND PIPING INSULATION PER SPECIFICATIONS.
6. COORDINATE FIRE DAMPER AND LISTED ASSEMBLY RATINGS WITH ARCHITECTURAL DRAWINGS. PROVIDE ACCESS DOOR AT ALL FIRE DAMPERS.
7. PROVIDE PENETRATION SYSTEMS NOT OTHERWISE SHOWN. PROVIDE UL LISTED ASSEMBLIES FOR PENETRATIONS THROUGH RATED PARTITIONS.
8. TOTAL STATIC PRESSURE NOTED IN THE SCHEDULES INCLUDES DUCT SYSTEM, TERMINAL UNITS, FILTERS, AND COILS. IT DOES NOT INCLUDE STATIC PRESSURE DROPS INTERNAL TO AHU AND EXHAUST FAN ASSEMBLIES.
9. THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. DUCT SIZES ARE NET INSIDE DIMENSIONS.
10. PROVIDE VOLUME DAMPERS AT ALL SUPPLY, RETURN AND EXHAUST DUCT BRANCH TAKE-OFFS. SEE DUCT CONSTRUCTION DETAILS.
11. BLANK OFF UNUSED LOUVER AREA WITH G90 20 GAUGE SHEET METAL DOUBLE WALL BLANK-OFF PANEL INSULATED WITH 2" RIGID FIBERBOARD. SEAL AIR TIGHT.
12. INSTALL RIGID 1"x1" GALVANIZED STEEL WIRE MESH AT ALL OPEN ENDED DUCTS.
13. ALL HYDRONIC BRANCH PIPING SHALL BE 3/4" UNLESS NOTED OTHERWISE.
14. VALVE SYMBOLS SHOWN ON DRAWINGS AND DETAILS ARE SCHEMATIC. REFER TO SPECIFICATIONS FOR VALVE TYPE BY SYSTEM. LOCATE AND ORIENT VALVES IN ACCESSIBLE LOCATIONS.
15. WATER PIPE CONNECTIONS TO AIR HEATING AND COOLING COILS SHALL BE MADE TO PROVIDE COUNTER FLOW BETWEEN WATER AND AIR.
16. FOR TYPICAL STEAM AND WATER PIPING CONNECTIONS TO EQUIPMENT, SEE STANDARD EQUIPMENT DETAILS.
17. ALL CONDENSATE DRAIN PIPING SHALL BE BRAZED, TYPE L COPPER PIPE.
18. SLOPE ALL CONDENSATE PIPING 1/4 INCH PER LINEAR FOOT TOWARDS DRAIN.
19. ALL PIPING PENETRATIONS THRU CONCRETE SLAB SHALL BE SPACED 6" MINIMUM ON CENTER.
20. SUPPORT PIPE IN A MANNER THAT AVOIDS STRESSES DUE TO THERMAL EXPANSION AND BUILDING DISPLACEMENT. PROVIDE PIPE EXPANSION IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
21. COORDINATE INSTALLATION OF NEW DUCTWORK AND PIPING WITH EXISTING BUILDING STRUCTURE, DUCTWORK, PIPING, ELECTRICAL CONDUIT, LIGHTING, ETC.
22. RELOCATE EXISTING DUCTWORK AND/OR PIPEWORK IN EXISTING CEILING SPACES TO ACCOMMODATE ALL RENOVATIONS AND ADDITIONS.
23. TAKE DOWN AND REINSTALL EXISTING CEILINGS IN ALL AREAS WHERE MECHANICAL WORK IS INDICATED AND EXISTING CEILINGS REMAIN. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN DRAWINGS FOR LOCATIONS WHERE EXISTING CEILINGS REMAIN. REPLACE CEILING TILES DAMAGED DURING WORK.
24. INSTALL ALL FLOOR MOUNTED HVAC EQUIPMENT, INCLUDING AHUS, PUMPS, CHILLERS, ETC. ON 6" MINIMUM HEIGHT CONCRETE HOUSEKEEPING PAD. EXTEND PAD MINIMUM 6" BEYOND EQUIPMENT AT ALL SIDES.
25. PATCH ALL WALLS, FLOORS, CEILINGS, AND ROOFS TO MATCH EXISTING IN ALL CASES WHERE EXISTING WALLS, FLOORS, CEILINGS AND ROOFS REMAIN AND HVAC DEMOLITION IS INDICATED.
26. SEE STRUCTURAL DRAWINGS FOR DESIGN REQUIREMENTS. ALL PRESSURES LISTED ARE GAGE PRESSURE UNLESS OTHERWISE NOTED.
27. SEISMIC ANCHORAGE AND SUPPORT OF MECHANCIAL DISTRIBUTION SYSTEMS AND EQUIPMENT IS REQUIRED AND PROVIDED BY CONTRACTOR.
28. FURNISH AND INSTALL ENGINEERED EQUIPMENT ANCHORAGE IN ACCORDANCE WITH IBC SEISMIC AND WIND-LOADING REQUIREMENTS. SUBMIT SEALED ANCHORAGE DETAILS TO ENGINEER AND COR FOR APPROVAL.
29. DIFFERENTIAL PRESSURES SHOWN REPRESENT DIFFERENTIAL PRESSURES RELATIVE TO THE OUTSIDE REFERENCE PRESSSURE OF 0.00" W.G.

PIPING SYMBOLS

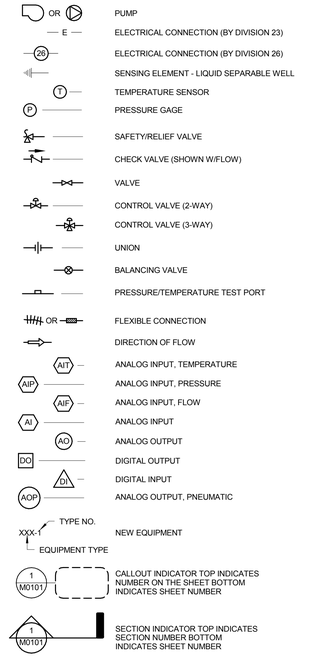
TERMINAL UNIT SYMBOLS



DRAWING SYMBOLS



MISCELLANEOUS SYMBOLS



MECHANICAL AND PLUMBING EQUIPMENT COMPONENTS EARTHQUAKE LOAD RESISTANCE

OCCUPANCY CATEGORY (IV) SEISMIC DESIGN CATEGORY (D)

LISTING OF EQUIPMENT AND SYSTEM COMPONENTS	ANCHORAGE TO FLOORS, ROOFS, ETC.		SWAY BRACING		LOCATION OF PROFESSIONALLY SEALED ANCHORAGE AND SWAY BRACING DETAILS			COMMENTS
					ON CONSTRUCTION DOCUMENTS	SUBSEQUENT SUBMITTAL		
	NOT PROVIDED FOR PROJECT	PROVIDED FOR PROJECT	NOT PROVIDED FOR PROJECT	PROVIDED FOR PROJECT	DRAWING NO. OR SPEC. SECTION	SHOP DRAWINGS	SEPARATE PERMIT & PLANS	
OTHER GENERAL EQUIPMENT & SYSTEM COMPONENTS Ip = 1.0 ROOF TOP: RTU, EF, MUA, CU > 400 lbs. RTU, EF, MUA, CU <= 400 lbs.	X	X	X			X		
FLOOR MOUNTED: AHU, BOILER, CHILLER > 400 lbs. FURNACE, FCU, ETC. <= 400 lbs.	X	X	X X			X		
EQUIPMENT SUSPENDED FROM THE STRUCTURE: EF, FCU, VAV, FTU > 20 lbs. EF, AIR TERMINAL UNITS <= 20 lbs.	X	X	X	X				
WALL MOUNTED EQUIPMENT: FCU, UV, UH, ETC.	X		X					
FIRE DAMPERS, LOUVERS	X		X					
SMALL DUCTWORK LARGE DUCTWORK	X	X	X	X		X		
PIPING <= 3"	X		X					
PIPING > 3" OR NON-DUCTILE	X			X				
AIR DEVICES	X		X					

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions: | Date

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Drawing Title: **SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351** (CANNON DESIGN PROJECT NO. 03850.05)

Building Number

Drawing Number: **MH-001**

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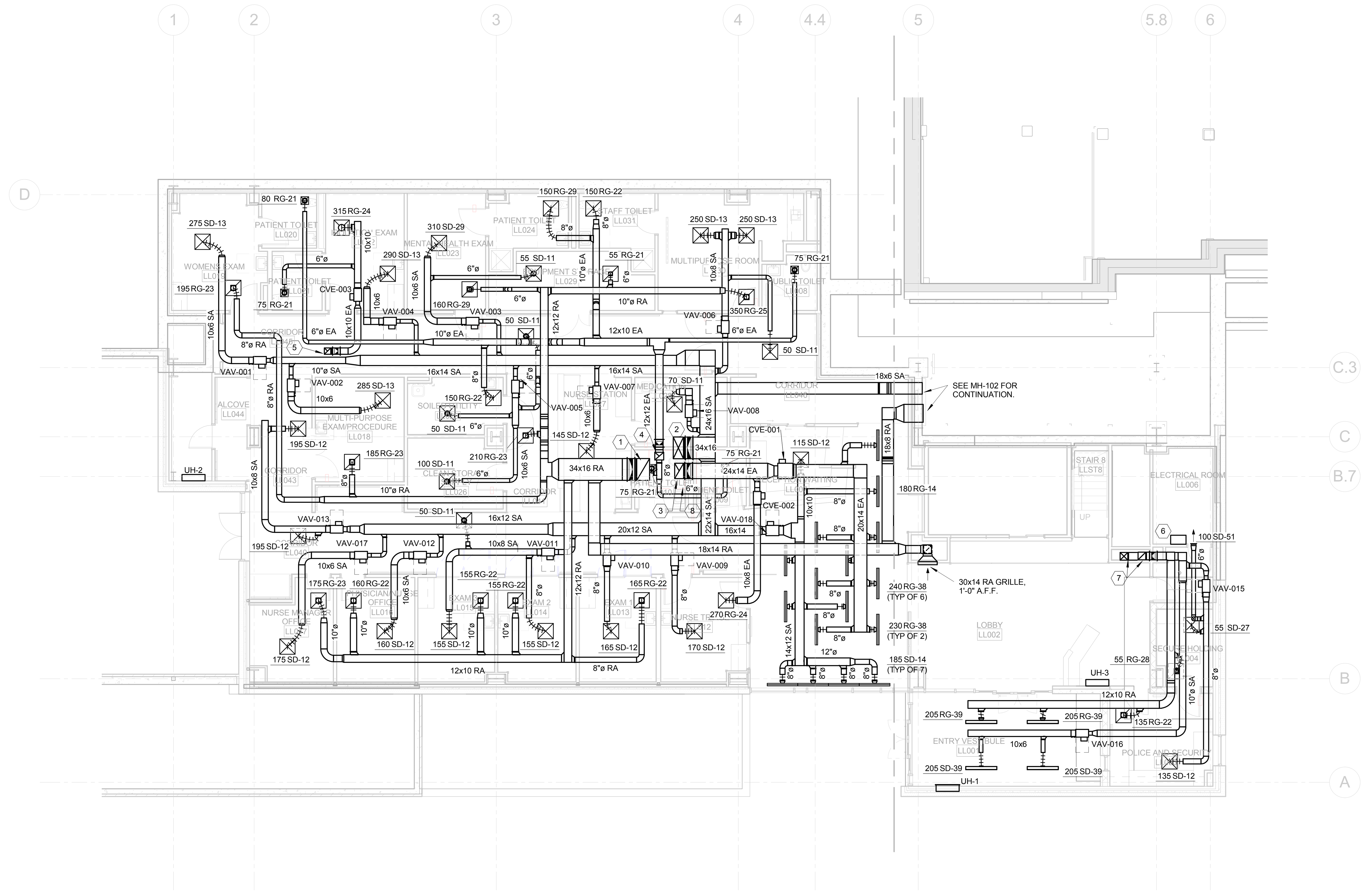
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



3F LOWER LEVEL - HVAC - DUCTWORK PLAN

1/8" = 1'-0"

NOTES:

1. 34x20 RA, UP IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
2. 34x16 SA, UP IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
3. 24x14 EA, UP IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
4. 14x12 EA, UP IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
5. 10x10 EA, UP IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
6. BMS CONTROL PANEL
7. 12x12 SA & 12x12 RA, UP IN SHAFT. PROVIDE FIRE/SMOKE DAMPERS AT SHAFT PENETRATIONS.
8. PROVIDE SPACE FOR ELECTRICAL CONDUITS ROUTING UP THROUGH FLOOR TO ELECTRICAL 1222. COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR.

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions: | Date

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Drawing Title: **LOWER LEVEL - HVAC DUCTWORK PLAN**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: **MH-101**

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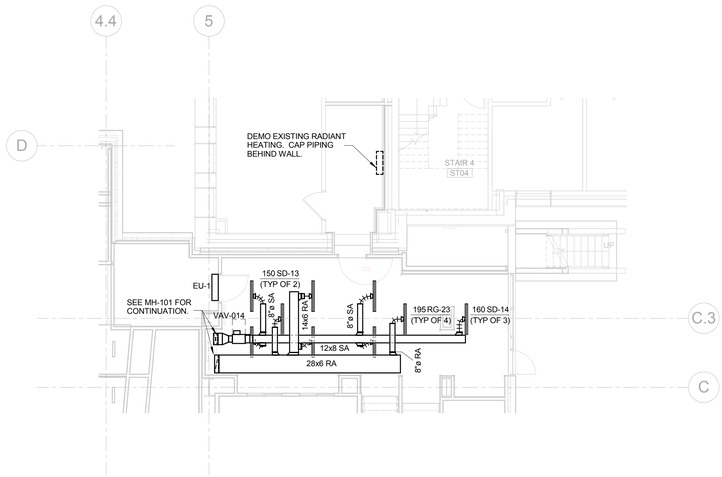

3E GROUND LEVEL - HVAC - DUCTWORK & DEMO PLAN
1/8" = 1'-0"

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

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Drawing Title
GROUND LEVEL - HVAC DUCTWORK & DEMO PLAN

Approved: Project Director

Project Title
John J. Pershing VAMC Clinical & Urgent Care Addition

Location
Poplar Bluff, Missouri

Date **DEC 14, 2015** | Checked **MEM** | Drawn **BE**

Project Number **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number
MH-102
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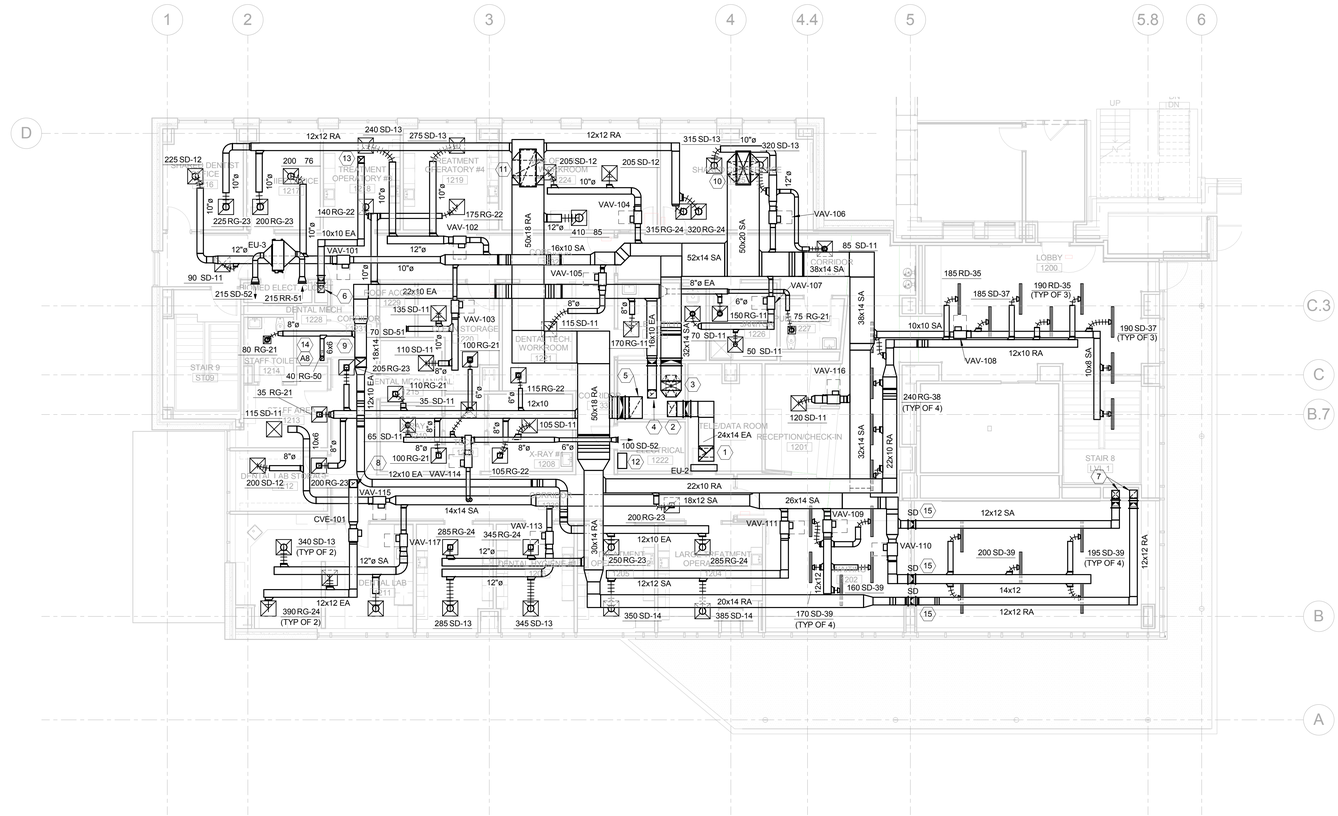

1E LEVEL ONE - HVAC - DUCTWORK PLAN
1/8" = 1'-0"

NOTES:

1. 24x14 EA, UP THROUGH ROOF TO EF-3.
2. 24x14 EA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
3. 34x14 SA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
4. 14x12 EA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
5. 34x20 RA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
6. 10x10 EA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
7. 12x12 SA & 12x12 RA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
8. 14x12 EA, UP THROUGH ROOF TO EF-4.
9. 18x14 EA, UP THROUGH ROOF TO EF-1.
10. 50x20 SA, UP TO AHU-1 IN PENTHOUSE.
11. 50x24 RA, UP TO AHU-1 IN PENTHOUSE.
12. BMS CONTROL PANEL
13. 10x10 EA, UP THROUGH ROOF TO EF-2.
14. 6x6 EA, TERMINATE 1'-0" A.F.F.
15. PROVIDE SMOKE DAMPER.

ALTERNATE NOTES:

A8 DENTAL MECHANICAL SCOPE SHALL NOT BEING INSTALLED IF BID ALTERNATE 8 IS ACCEPTED.

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

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Drawing Title: **LEVEL 01 - HVAC DUCTWORK PLAN**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: **MH-103**
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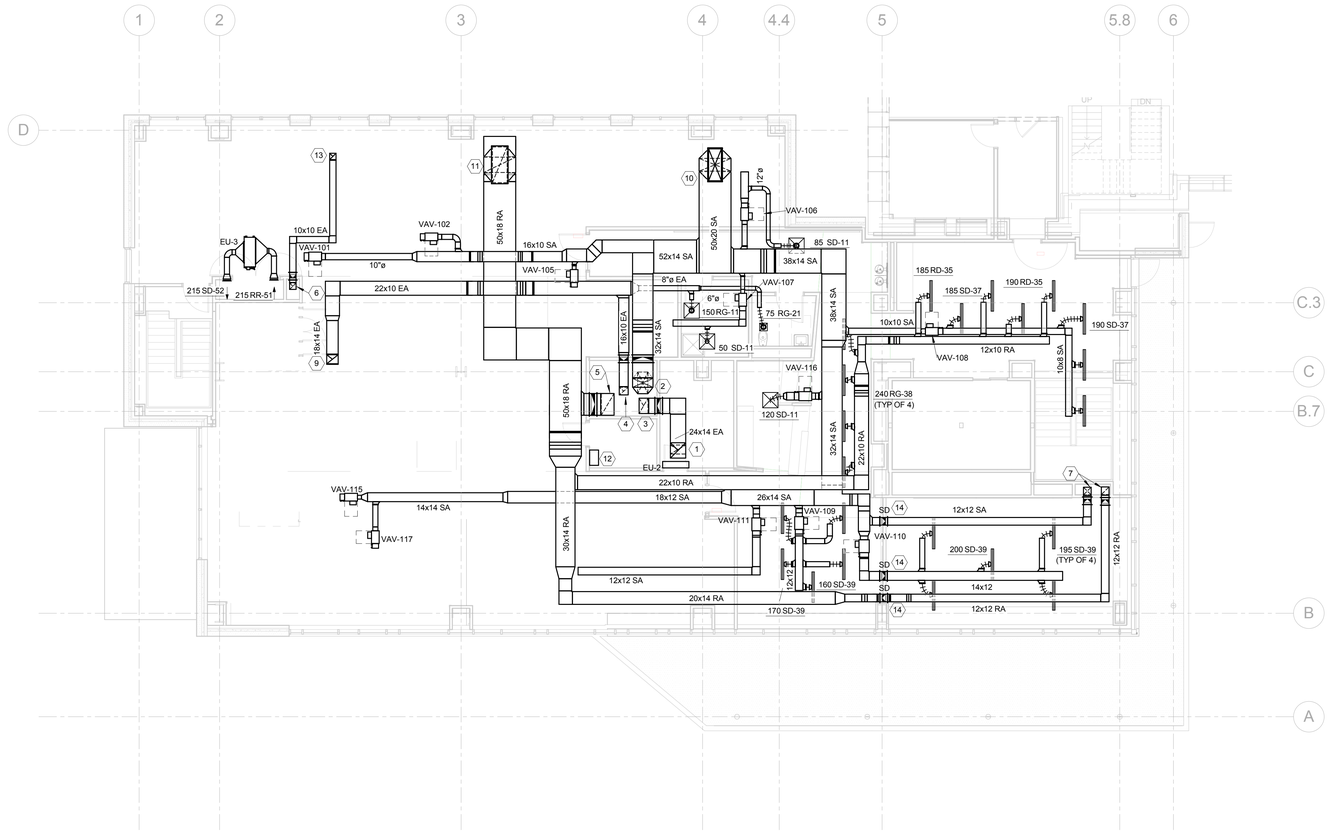

1 LEVEL 01 PLAN - HVAC - DUCTWORK - BID ALTERNATE 1
1/8" = 1'-0"

NOTES:

1. 24x14 EA, UP THROUGH ROOF TO EF-3.
2. 24x14 EA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
3. 34x18 SA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
4. 14x12 EA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
5. 34x20 RA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
6. 10x10 EA, DN IN SHAFT. PROVIDE FIRE/SMOKE DAMPER AT SHAFT PENETRATION.
7. 12x12 SA & 12x12 RA, DN IN SHAFT.
9. 18x14 EA, UP THROUGH ROOF TO EF-1.
10. 50x24 SA, UP TO AHU-1 IN PENTHOUSE.
11. 50x24 RA, UP TO AHU-1 IN PENTHOUSE.
12. BMS CONTROL PANEL
13. 10x10 EA, UP THROUGH ROOF TO EF-2.
14. PROVIDE SMOKE DAMPER.

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

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Drawing Title
LEVEL 01- HVAC DUCTWORK PLAN - BID ALTERNATE 1

Approved: Project Director

Project Title
John J. Pershing VAMC Clinical & Urgent Care Addition

Location
Poplar Bluff, Missouri

Date **DEC 14, 2015** | Checked **MEM** | Drawn **BE**

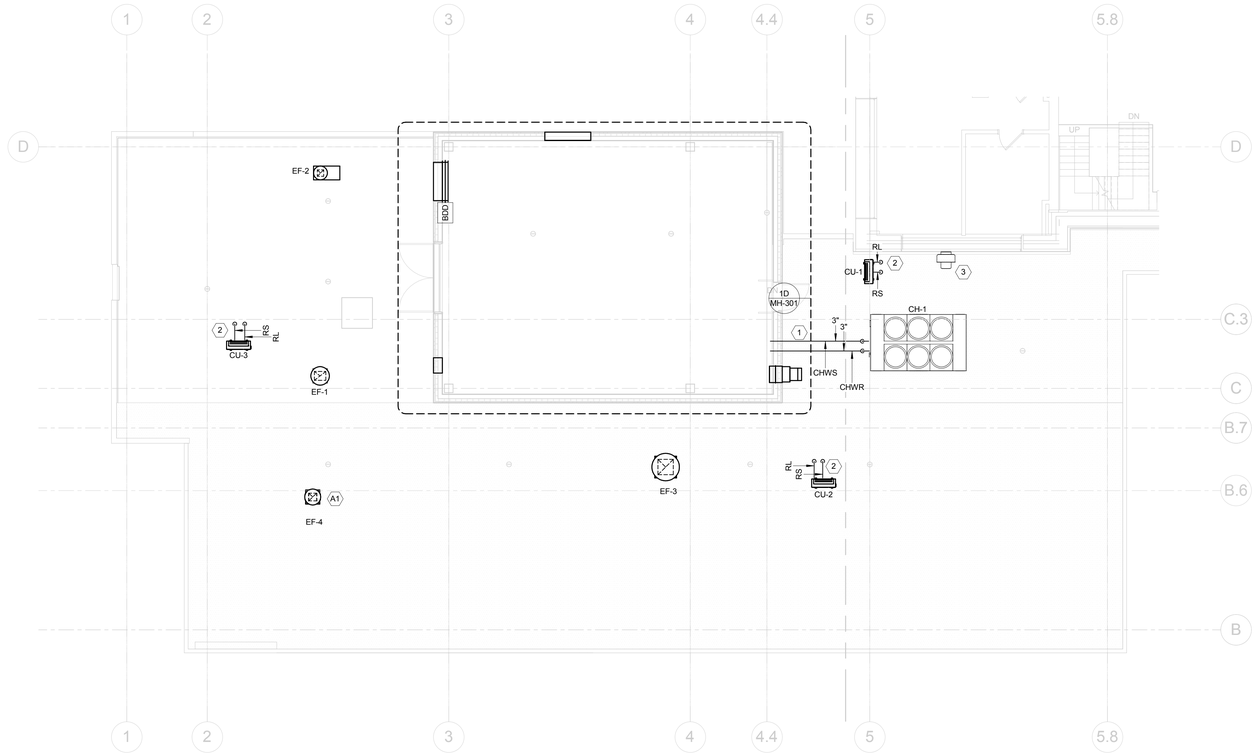
Project Number **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number
MH-103A
Dwg. of

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



2E ROOF LEVEL - HVAC - PLAN
1/8" = 1'-0"

NOTES:

1. PROVIDE HEAT TRACE FOR EXTERIOR CHILLED WATER PIPING, REFER TO ELECTRICAL DRAWINGS FOR CONNECTION.
2. ROUTE REFRIGERANT LIQUID & SUCTION LINES FROM CONDENSING UNITS DOWN THROUGH BUILDING TO CORRESPONDING EVAPORATOR UNIT. MINIMIZE PIPING LENGTH.
3. TEMPORARILY DISCONNECT & REMOVE EXISTING EXHAUST FAN FOR DOOR INSTALLATION. COORDINATE WITH ARCHITECTURAL AND ELECTRICAL WORK. REINSTALL EXHAUST FAN UPON COMPLETION OF RELATED ARCHITECTURAL WORK. STARTUP AND RECOMMISSION TO ORIGINAL AIRFLOW.

ALTERNATE NOTES:

A1. EF-4 SHALL NOT BE INSTALLED IF BID ALTERNATE 1 IS ACCEPTED.

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions: | Date

CONSULTANTS:

Landmark Engineering Group, Inc.
Civil Engineer
2834 104th Street
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515.221.1322

SidePlate
Steel Frame
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Mission Viejo, CA
949.305.7889

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Elevator
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703.608.2263

ARCHITECT/ENGINEERS:

CANNONDESIGN

1100 Clark Avenue
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Drawing Title: **ROOF LEVEL - HVAC PLAN**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351** (CANNON DESIGN PROJECT NO. 03850.05)

Building Number

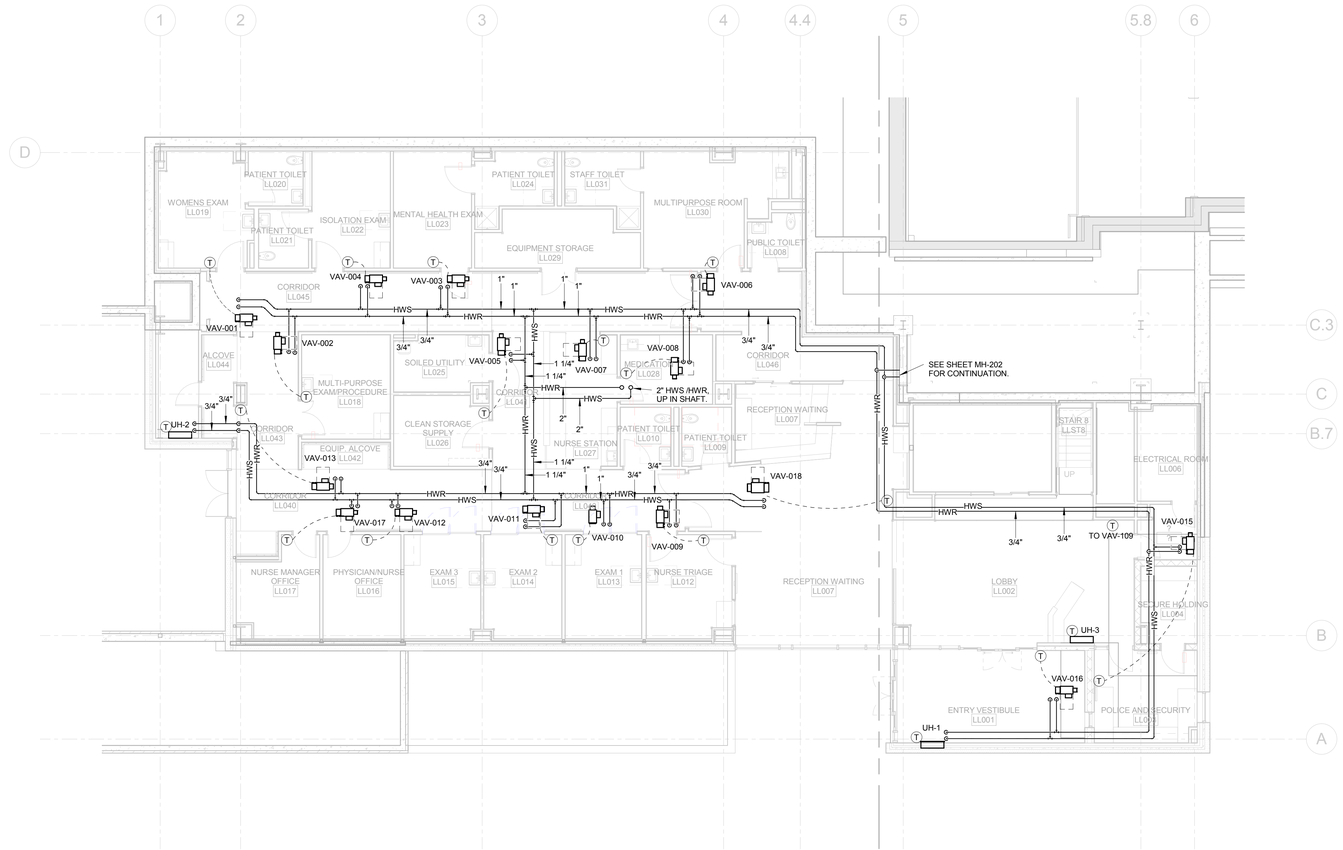
Drawing Number: **MH-104**

Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



2E LOWER LEVEL - HVAC - PIPING PLAN
1/8" = 1'-0"

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

CONSULTANTS:

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ARCHITECT/ENGINEERS:

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Drawing Title: **LOWER LEVEL - HVAC PIPING PLAN**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

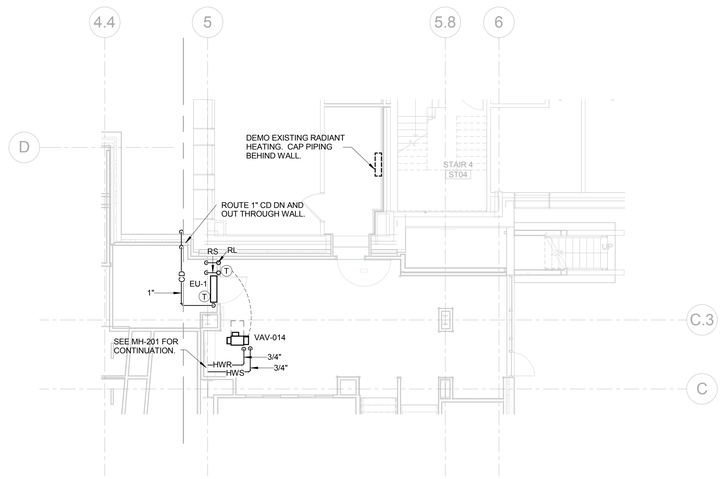
Building Number

Drawing Number: **MH-201**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



3E GROUND LEVEL - HVAC - PIPING PLAN
1/8" = 1'-0"

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

CONSULTANTS:

Landmark Engineering Group, Inc.
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ARCHITECT/ENGINEERS:

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Drawing Title: **GROUND LEVEL - HVAC PIPING PLAN**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

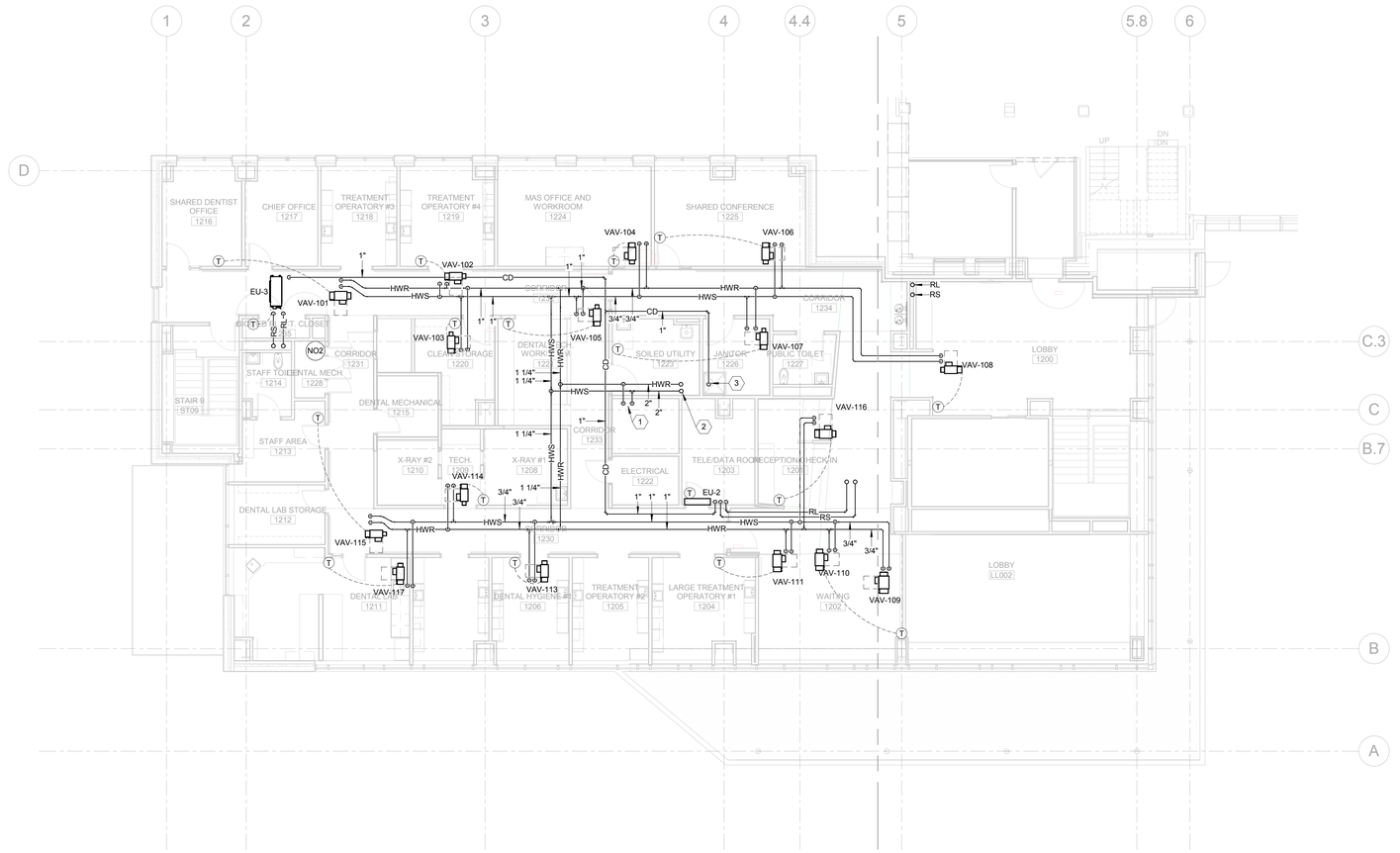
Building Number

Drawing Number: **MH-202**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



NOTES:

1. 2" HWS & HWR, DN IN SHAFT.
2. 2" HWS & HWR, UP TO PENTHOUSE.
3. 1-1/2" CD, DN. TERMINATE ABOVE MOP SINK.

1E LEVEL ONE - HVAC - PIPING PLAN

1/8" = 1'-0"

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

CONSULTANTS:

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ARCHITECT/ENGINEERS:

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Drawing Title: **LEVEL 01 - HVAC PIPING PLAN**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

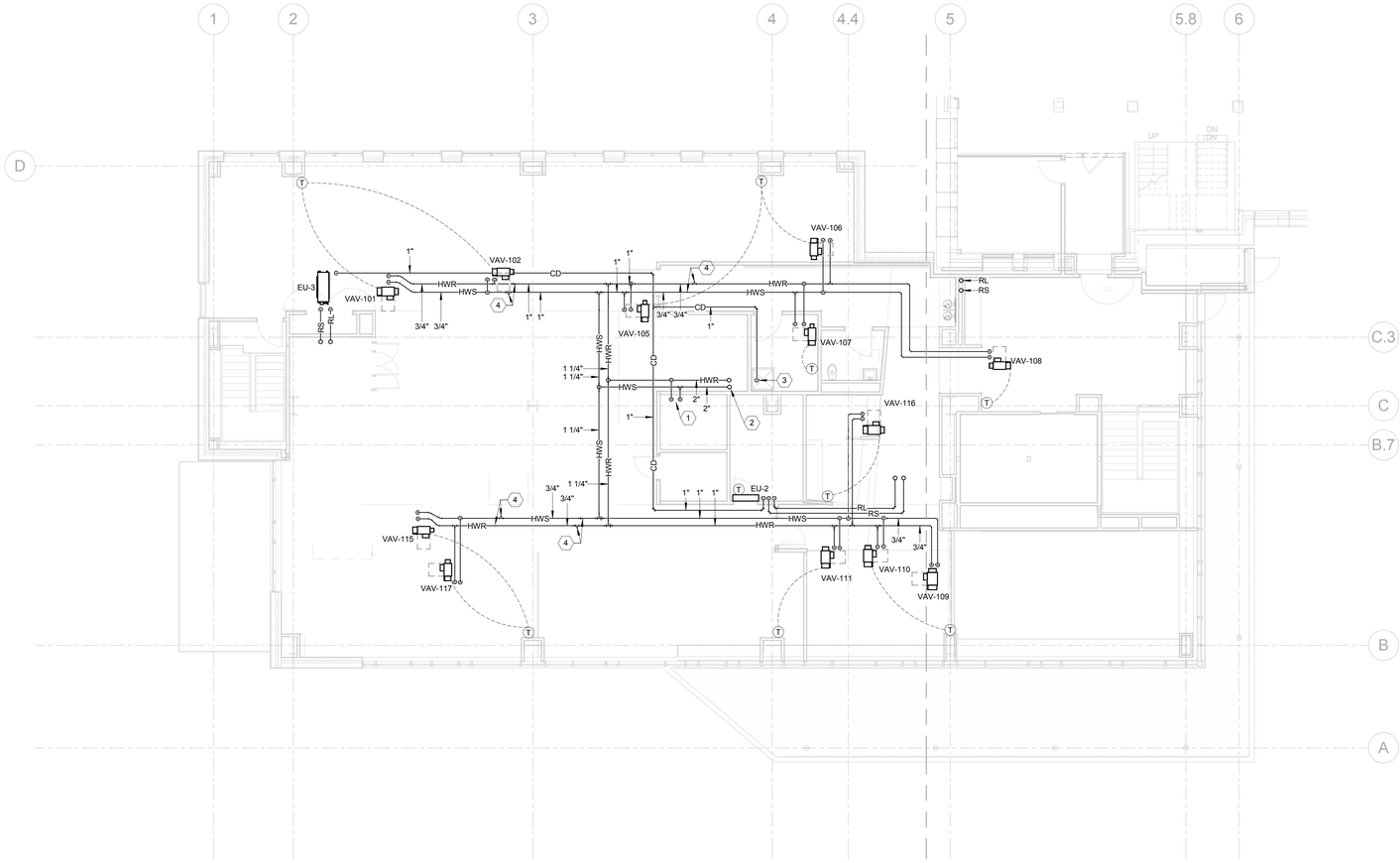
Building Number

Drawing Number: **MH-203**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



NOTES:

1. 2" HWS & HWR, DN IN SHAFT.
2. 2" HWS & HWR, UP TO PENTHOUSE.
3. 1-1/2" CD, DN. TERMINATE ABOVE MOP SINK.
4. CAP TEE FITTING FOR FUTURE VAV HWS & HWR CONNECTIONS.

1 LEVEL 01 PLAN - HVAC - PIPING - BID ALTERNATE 1
1/8" = 1'-0"

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions: | Date

CONSULTANTS:

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Drawing Title: **LEVEL 01 - HVAC PIPING PLAN - BID ALTERNATE 1**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **Checker** | Drawn: **Author**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

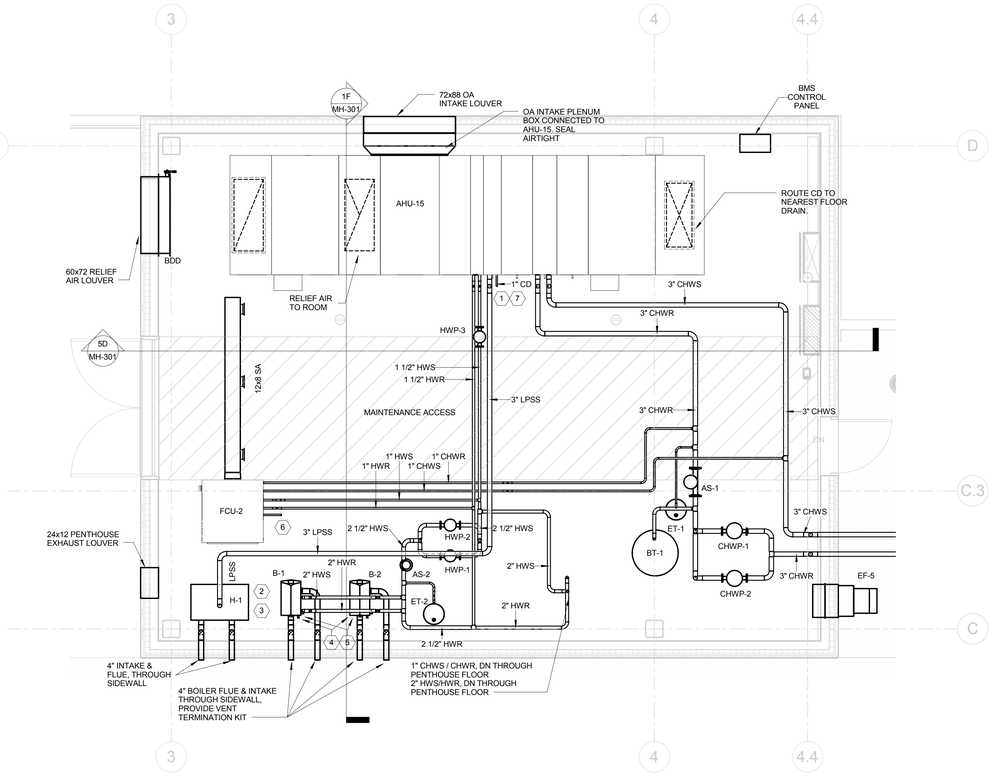
Drawing Number: **MH-203A**

Dwg. of

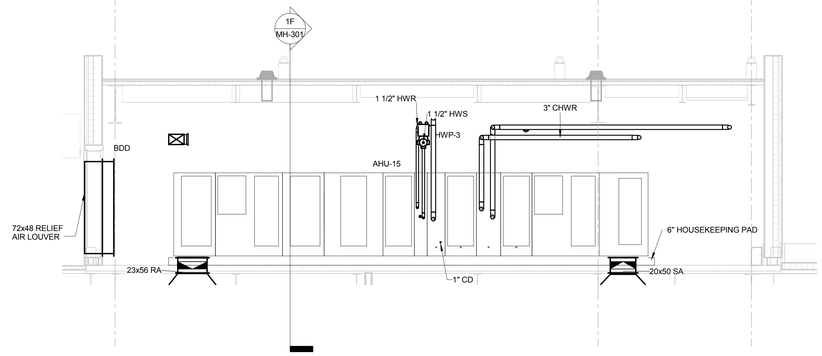
Office of Construction and Facilities Management

Department of Veterans Affairs

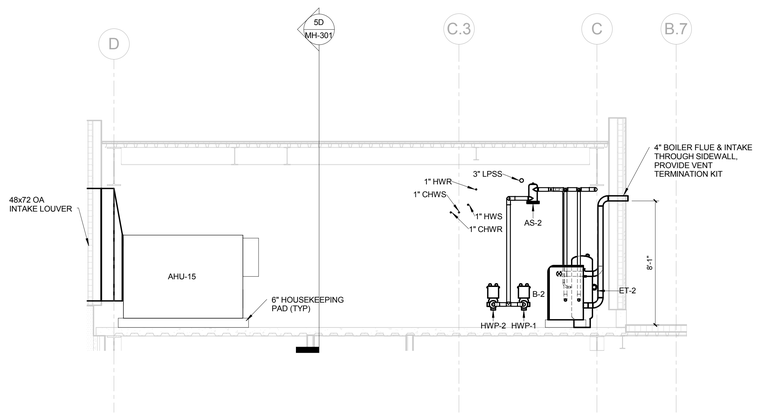
VA FORM 08-6231



1D ENLARGED PENTHOUSE PLAN - HVAC
1/4" = 1'-0"



5D MECHANICAL ROOM SECTION 1
1/4" = 1'-0"



1F MECHANICAL ROOM SECTION 2
1/4" = 1'-0"

NOTES:

1. ROUTE HUMIDIFIER CONDENSATE DRAIN TO NEAREST FLOOR DRAIN.
2. 3/4" NG CONNECTION. SEE PLUMBING DRAWINGS.
3. 3/4" CONDENSATE DRAIN. ROUTE TO NEAREST FLOOR DRAIN.
4. 1" NG CONNECTION. SEE PLUMBING DRAWINGS.
5. 3/4" HEAT EXHANGER AND CONDENSATE DRAINS. ROUTE TO NEAREST FLOOR DRAIN.
6. 1" CONDENSATE DRAIN. ROUTE TO NEAREST FLOOR DRAIN.
7. CONNECT HUMIDIFIER DISPERSION MANIFOLD CONDENSATE DRAIN TO DRAIN COOLER. ROUTE DRAIN COOLER DISCHARGE TO FLOOR DRAIN. SET AT 135 DEGREES F.

N

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions:	Date

CONSULTANTS:

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ARCHITECT/ENGINEERS:

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Drawing Title: **ENLARGED PLANS AND SECTIONS**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: **MH-301**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

HVAC DESIGN DATA

DESIGN CONDITIONS		SUMMER			WINTER			LOWEST AVERAGE ANNUAL DEWPOINT
		TEMP	WB TEMP	% HUMIDITY	TEMP	DP TEMP	% HUMIDITY	
		°F	°F		°F	°F		°F
OUTDOOR DESIGN CONDITIONS		94	78	50	9.5	0	NA	2
INDOOR AREA DESIGN CONDITIONS								
ROOM NUMBER	ROOM NAME							
LL001	ENTRY VESTIBULE	72	60	50	70	53	30	
LL002	LOBBY	72	60	50	70	53	30	
LL003	POLICE AND SECURITY	72	60	50	70	53	30	
LL004	SECURE HOLDING	72	60	50	70	53	30	
LL005	FUTURE CORRIDOR	72	60	50	70	53	30	
LL006	ELECTRICAL ROOM	72	60	50	70	53	30	
LL007	RECEPTION/WAITING	72	60	50	70	53	30	
LL008	PUBLIC TOILET	72	60	50	70	53	30	
LL009	PATIENT TOILET	72	60	50	70	53	30	
LL010	PATIENT TOILET	72	60	50	70	53	30	
LL012	NURSE TRIAGE	72	60	50	70	53	30	
LL013	EXAM 1	72	60	50	70	53	30	
LL014	EXAM 2	72	60	50	70	53	30	
LL015	EXAM 3	72	60	50	70	53	30	
LL016	PHYSICIAN/NURSE OFFICE	72	60	50	70	53	30	
LL017	NURSE MANAGER OFFICE	72	60	50	70	53	30	
LL018	MULTI-PURPOSE EXAM-PROCEDURE	72	60	50	70	53	30	
LL019	WOMENS EXAM	72	60	50	70	53	30	
LL020	PATIENT TOILET	72	60	50	70	53	30	
LL021	PATIENT TOILET	72	60	50	70	53	30	
LL022	ISOLATION EXAM	72	60	50	70	53	30	
LL023	MENTAL HEALTH EXAM	72	60	50	70	53	30	
LL024	PATIENT TOILET	72	60	50	70	53	30	
LL025	SOILED UTILITY	72	60	50	70	53	30	
LL026	CLEAN STORAGE SUPPLY	72	60	50	70	53	30	
LL027	NURSE STATION-WORK ROOM	72	60	50	70	53	30	
LL028	MEDICATION ROOM	72	60	50	70	53	30	
LL029	EQUIPMENT STORAGE	72	60	50	70	53	30	
LL030	MULTIPURPOSE ROOM	72	60	50	70	53	30	
LL031	STAFF TOILET	72	60	50	70	53	30	
LL040	CORRIDOR SOUTH	72	60	50	70	53	30	
LL041	CORRIDOR CENTER	72	60	50	70	53	30	
LL043	CORRIDOR WEST	72	60	50	70	53	30	
LL045	CORRIDOR NORTH	72	60	50	70	53	30	
LL046	CORRIDOR NORTH EAST	72	60	50	70	53	30	
G090	LOBBY	72	60	50	70	53	30	
G091	ELEVATOR MACHINE ROOM	72	60	50	70	53	30	
G092	STAIR	72	60	50	70	53	30	
1200	LOBBY	72	60	50	70	53	30	
1201	RECEPTION CHECK-IN	72	60	50	70	53	30	
1202	WAITING	72	60	50	70	53	30	
1203	TELE-DATA ROOM	72	60	50	70	53	30	
1204	LARGE TREATMENT OPERATORY 1	72	60	50	70	53	30	
1205	TREATMENT OPERATORY 2	72	60	50	70	53	30	
1206	DENTAL HYGIENE 1	72	60	50	70	53	30	
1207	DENTAL HYGIENE 2	72	60	50	70	53	30	
1208	X-RAY 1	72	60	50	70	53	30	
1209	TECH	72	60	50	70	53	30	
1210	X-RAY 2	72	60	50	70	53	30	
1211	DENTAL LAB	72	60	50	70	53	30	
1212	DENTAL LAB STORAGE	72	60	50	70	53	30	
1213	STAFF AREA	72	60	50	70	53	30	
1214	STAFF TOILET	72	60	50	70	53	30	
1215	DENTAL MECHANICAL	72	60	50	70	53	30	
1216	SHARED DENTIST OFFICE	72	60	50	70	53	30	
1217	CHIEF OFFICE	72	60	50	70	53	30	
1218	TREATMENT OPERATORY 3	72	60	50	70	53	30	
1219	TREATMENT OPERATORY 4	72	60	50	70	53	30	
1220	CLEAN STORAGE	72	60	50	70	53	30	
1221	DENTAL TECH WORKROOM	72	60	50	70	53	30	
1222	ELECTRICAL	72	60	50	70	53	30	
1223	SOILED UTILITY	72	60	50	70	53	30	
1224	MAS OFFICE AND WORKROOM	72	60	50	70	53	30	
1225	SHARED CONFERENCE	72	60	50	70	53	30	
1226	JANITOR	72	60	50	70	53	30	
1227	PUBLIC TOILET	72	60	50	70	53	30	
1229	ROOF ACCESS	72	60	50	70	53	30	
1230	CORRIDOR SOUTH	72	60	50	70	53	30	
1231	CORRIDOR WEST	72	60	50	70	53	30	
1232	CORRIDOR NORTH WEST	72	60	50	70	53	30	
1232A	BIOMED ELECT CLOSET	72	60	50	70	53	30	
1233	CORRIDOR CENTER	72	60	50	70	53	30	
1234	CORRIDOR NORTH EAST	72	60	50	70	53	30	

AIR DEVICE SCHEDULE (LINEAR)

MARK	TYPE	AIR FLOW		MAX APD	MIN THROW	MAX THROW	# OF SLOTS	SLOT WIDTH	PANEL/ FRAME SIZE	NECK SIZE	THROW PATTERN	THROW TYPE	NC	DAMPER	FINISH	REMARKS
		MIN	MAX													
		CFM	CFM	IN WG	FT	FT		IN	IN	IN						
SD-31	LINEAR	180	580	0.27	4 - 7 -15	17 - 21 - 30	2	2	24 x 4	10 ø	2 WAY	VERTICAL	41	NONE	WHITE	1
SD-32	LINEAR	150	510	0.28	4 - 8 - 16	18 - 22 - 31	2	2	24 x 4	12 ø	2 WAY	VERTICAL	42	NONE	WHITE	1
SD-33	LINEAR	180	570	0.18	3 - 5 - 11	12 - 15 - 22	2	2.5	24 x 4	10 ø	2 WAY	VERTICAL	43	NONE	WHITE	1
SD-34	LINEAR	210	660	0.24	4 - 6 - 13	13 - 17 - 23	2	2.5	24 x 4	12 ø	2 WAY	VERTICAL	41	NONE	WHITE	1
SD-35	LINEAR	140	500	0.27	4 - 7 - 15	17 - 21 - 30	2	2	24 x 4	10 ø	2 WAY	HORIZONTAL	41	NONE	WHITE	1
SD-36	LINEAR	150	510	0.28	4 - 8 - 16	18 - 22 - 31	2	2	24 x 4	12 ø	2 WAY	HORIZONTAL	42	NONE	WHITE	1
SD-37	LINEAR	180	570	0.18	3 - 5 - 11	12 - 15 - 22	2	2.5	24 x 4	10 ø	2 WAY	HORIZONTAL	43	NONE	WHITE	1
SD-38	LINEAR	210	660	0.24	4 - 6 -13	13 - 17 - 23	2	2.5	24 x 4	12 ø	2 WAY	HORIZONTAL	41	NONE	WHITE	1
RD-31	LINEAR	180	580	0.27	4 - 7 -15	17 - 21 - 30	2	2	24 x 4	10 ø	2 WAY	VERTICAL	41	NONE	WHITE	1
RD-32	LINEAR	150	510	0.28	4 - 8 - 16	18 - 22 - 31	2	2	24 x 4	12 ø	2 WAY	VERTICAL	42	NONE	WHITE	1
RD-33	LINEAR	180	570	0.18	3 - 5 - 11	12 - 15 - 22	2	2.5	24 x 4	10 ø	2 WAY	VERTICAL	43	NONE	WHITE	1
RD-34	LINEAR	210	660	0.24	4 - 6 - 13	13 - 17 - 23	2	2.5	24 x 4	12 ø	2 WAY	VERTICAL	41	NONE	WHITE	1
RD-35	LINEAR	140	500	0.27	4 - 7 - 15	17 - 21 - 30	2	2	24 x 4	10 ø	2 WAY	HORIZONTAL	41	NONE	WHITE	1
RD-36	LINEAR	150	510	0.28	4 - 8 - 16	18 - 22 - 31	2	2	24 x 4	12 ø	2 WAY	HORIZONTAL	42	NONE	WHITE	1
RD-37	LINEAR	180	570	0.18	3 - 5 - 11	12 - 15 - 22	2	2.5	24 x 4	10 ø	2 WAY	HORIZONTAL	43	NONE	WHITE	1
RD-38	LINEAR	210	660	0.24	4 - 6 -13	13 - 17 - 23	2	2.5	24 x 4	12 ø	2 WAY	HORIZONTAL	41	NONE	WHITE	1

NOTES:
1. PROVIDE COLLAR AND TRANSITION AS REQUIRED.

AIR DEVICE SCHEDULE (SUPPLY)

MARK	TYPE	AIR FLOW		MAX APD	MOUNTING	PANEL/ FRAME SIZE	NECK SIZE	NC	DAMPER	FINISH	REMARKS
		MIN	MAX								
		CFM	CFM	IN WG		IN x IN	IN				
SD-11	LOUVERED FACE	40	160	0.080	CEILING	24 x 24	6 ø	19	NONE	WHITE	
SD-12	LOUVERED FACE	70	280	0.100	CEILING	24 x 24	8 ø	23	NONE	WHITE	
SD-13	LOUVERED FACE	110	380	0.090	CEILING	24 x 24	10 ø	22	NONE	WHITE	
SD-14	LOUVERED FACE	160	470	0.080	CEILING	24 x 24	12 ø	19	NONE	WHITE	
SD-15	LOUVERED FACE	220	640	0.090	CEILING	24 x 24	14 ø	21	NONE	WHITE	
SD-16	LOUVERED FACE	250	740	0.100	CEILING	24 x 24	16 ø	22	NONE	WHITE	
SD-27	PERFORATED SUICIDE DETERENT GRILLE	45	110	0.100	CEILING	24x24	8x8	10	NONE	WHITE	1, 2, 3, 4
SD-28	PERFORATED SUICIDE DETERENT GRILLE	225	625	0.100	CEILING	24x24	18x18	10	NONE	WHITE	1, 2, 3, 4
SD-51	SUPPLY REGISTER	70	120	0.100	WALL	8 x 8	6 x 6	25	OBD	WHITE	
SD-52	SUPPLY REGISTER	80	160	0.090	WALL	12 x 8	10 x 6	25	OBD	WHITE	
SD-53	SUPPLY REGISTER	130	350	0.080	WALL	14 x 10	12 x 8	26	OBD	WHITE	
SD-54	SUPPLY REGISTER	200	500	0.100	WALL	14 x 12	12 x 10	26	OBD	WHITE	
SD-55	SUPPLY REGISTER	400	700	0.080	WALL	18 x 12	18 x 10	26	OBD	WHITE	
SD-56	SUPPLY REGISTER	360	700	0.070	WALL	18 x 18	16 x 16	27	OBD	WHITE	
SD-57	SUPPLY REGISTER	560	1100	0.070	WALL	22 x 22	20 x 20	28	OBD	WHITE	
SD-58	SUPPLY REGISTER	1250	3000	0.100	WALL	32 x 32	30 x 30	36	OBD	WHITE	

NOTES:
1. PERFORATED SUICIDE DETERRENT GRILLE. SHALL COMPLY WITH NATIONAL INSTITUTE OF CORRECTIONS GUIDELINES FOR SUICIDE PREVENTION AND CALIFORNIA TITLE 24.
2. 3/16" FACE PLATE WITH 3/16" DIAMETER HOLES ON 9/32" STAGGERED CENTERS.
3. PROVIDE 1 1/2" x 1/2" x 3/16" ANGLE FRAME FOR MOUNTING.
4. FRAME OUT REGISTER LOCATION AND FASTEN SECURELY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

FIRE AND SMOKE DAMPER SCHEDULE

MARK	LOCATION	FAN SYSTEM	SYSTEM AND/OR SERVICE	DUCT SIZE	DUCT PRESSURE CLASS	ACTUATOR VOLTAGE	REMARKS
				IN	IN WG		
F/SD-001	LL SHAFT	SF-1 & 2	AHU-15 SUPPLY	34x16	4	24	FIRE/SMOKE DAMPER
F/SD-002	LL SHAFT	RF-1 & 2	AHU-15 RETURN	34x20	4	24	FIRE/SMOKE DAMPER
F/SD-003	LL SHAFT	EF-1	EF-1 GENERAL EXHAUST	12x12	4	24	FIRE/SMOKE DAMPER
F/SD-004	LL ISOLATION EXAM SHAFT	EF-2	EF-2 ISOLATION EXAM EXHAUST	10x10	4	24	FIRE/SMOKE DAMPER
F/SD-005	LL SHAFT	EF-3	EF-3 LL WAITING EXHAUST	24x14	4	24	FIRE/SMOKE DAMPER
F/SD-006	LL SMALL SHAFT	SF-1 & 2	AHU-15 SUPPLY	12x12	4	24	FIRE/SMOKE DAMPER
F/SD-007	LL SMALL SHAFT	RF-1 & 2	AHU-15 RETURN	12x12	4	24	FIRE/SMOKE DAMPER
F/SD-101	1ST LEVEL SHAFT	SF-1 & 2	AHU-15 SUPPLY	32x14	4	24	FIRE/SMOKE DAMPER
F/SD-102	1ST LEVEL SHAFT	RF-1 & 2	AHU-15 RETURN	34x20	4	24	FIRE/SMOKE DAMPER
F/SD-103	1st LEVEL SHAFT	EF-1	EF-1 GENERAL EXHAUST	14x12	4	24	FIRE/SMOKE DAMPER
F/SD-104	1ST LEVEL ISOLATION EXAM SHAFT	EF-2	EF-2 ISOLATION EXAM EXHAUST	10X10	4	24	FIRE/SMOKE DAMPER
F/SD-105	1st LEVEL SHAFT	EF-3	EF-3 LL WAITING EXHAUST	24x14	4	24	FIRE/SMOKE DAMPER
F/SD-106	1ST LEVEL SMALL SHAFT	SF-1 & 2	AHU-15 SUPPLY	12x12	4	24	FIRE/SMOKE DAMPER
F/SD-107	1ST LEVEL SMALL SHAFT	RF-1 & 2	AHU-15 RETURN	12x12	4	24	FIRE/SMOKE DAMPER
SD-108	1ST LEVEL LOBBY	SF-1 & 2	AHU-15 SUPPLY	12x12	4	24	SMOKE DAMPER
SD-109	1ST LEVEL LOBBY	SF-1 & 2	AHU-15 SUPPLY	14x12	4	24	SMOKE DAMPER
SD-110	1ST LEVEL LOBBY	RF-1 & 2	AHU-15 RETURN	12x12	4	24	SMOKE DAMPER
SD-1	PENTHOUSE	RF-1 & 2	AHU-15 RETURN	56x23	4	24	SMOKE DAMPER
SD-2	PENTHOUSE	SF-1 & 2	AHU-15 SUPPLY	49x30	4	24	SMOKE DAMPER

AIR DEVICE SCHEDULE (RETURN)

MARK	TYPE	AIR FLOW		MAX APD	MOUNTING	PANEL/ FRAME SIZE	NECK SIZE	NC	DAMPER	FINISH	REMARKS
		MIN	MAX								
		CFM	CFM	IN WG		IN x IN	IN x IN				
RG-21	PERFORATED	60	100	0.088	CEILING	24 x 24	6 DIAM	13	NONE	WHITE	
RG-22	PERFORATED	110	170	0.088	CEILING	24 x 24	8 DIAM	13	NONE	WHITE	
RG-23	PERFORATED	170	250	0.088	CEILING	24 x 24	10 DIAM	14	NONE	WHITE	
RG-24	PERFORATED	240	400	0.088	CEILING	24 x 24	12 DIAM	12	NONE	WHITE	
RG-25	PERFORATED	320	500	0.087	CEILING	24 x 24	14 DIAM	14	NONE	WHITE	
RG-26	PERFORATED	420	700	0.087	CEILING	24 x 24	16 DIAM	16	NONE	WHITE	
RG-27	PERFORATED SUICIDE DETERRENT GRILLE	25	100	0.100	CEILING	12 x 12	6 x 6	11	NONE	WHITE	1, 2, 3, 4
RG-28	PERFORATED SUICIDE DETERRENT GRILLE	45	110	0.100	CEILING	24 x 24	8 x 8	10	NONE	WHITE	1, 2, 3, 4
RG-29	PERFORATED SUICIDE DETERRENT GRILLE	100	400	0.100	CEILING	24 x 24	12 x 12	18	NONE	WHITE	1, 2, 3, 4
RR-50	RETURN REGISTER	40	130	0.078	WALL	6 x 6	6 x 6	13	OBD	WHITE	
RR-51	RETURN REGISTER	130	210	0.078	WALL	10 x 10	8 x 8	13	OBD	WHITE	
RR-52	RETURN REGISTER	200	330	0.078	WALL	12 x 12	10 x 10	15	OBD	WHITE	
RR-53	RETURN REGISTER	270	440	0.078	WALL	14 x 14	12 x 12	17	OBD	WHITE	
RR-54	RETURN REGISTER	250	610	0.082	WALL	16 x 16	14 x 14	18	OBD	WHITE	
RR-55	RETURN REGISTER	320	810	0.082	WALL	18 x 18	16 x 16	19	OBD	WHITE	
RR-56	RETURN REGISTER	90	160	0.078	WALL	10 x 8	8 x 6	12	OBD	WHITE	
RR-57	RETURN REGISTER	140	240	0.078	WALL	14 x 8	12 x 6	14	OBD	WHITE	
RR-58	RETURN REGISTER	210	350	0.078	WALL	20 x 8	18 x 6	16	OBD	WHITE	
RR-59	RETURN REGISTER	190	320	0.078	WALL	14 x 10	12 x 8	15	OBD	WHITE	
RR-510	RETURN REGISTER	220	360	0.078	WALL	14 x 12	12 x 10	16	OBD	WHITE	
RR-511	RETURN REGISTER	330	560	0.078	WALL	20 x 12	18 x 10	17	OBD	WHITE	
RR-512	RETURN REGISTER	360	850	0.082	WALL	26 x 14	24 x 12	20	OBD	WHITE	
RR-513	RETURN REGISTER	460	1260	0.095	WALL	32 x 14	30 x 12	24	OBD	WHITE	

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Revisions: | Date

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Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: **MH-501**
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Department of Veterans Affairs

VA FORM 08-6231

AIR HANDLING UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	AIR FLOW	AIR FLOW			SUPPLY FAN MARK	RETURN OR RELIEF FAN MARK	EXHAUST FAN MARK	PREFILTER MARK	AFTER FILTER MARK	FINAL FILTER MARK	HEAT RECOVERY MARK	PREHEAT COIL MARK	COOLING COIL MARK	REHEAT COIL	HUMIDIFIER MARK	DIMENSIONS			REMARKS
					SUPPLY	MIN OA	RETURN												LENGTH	WIDTH	HEIGHT	
				CFM	CFM	CFM	CFM												IN	IN	IN	
AHU-15	PENTHOUSE	BUILDING	PACKAGED	VAV	17270	6945	10325	SF-1 & 2	RF-1 & 2	N/A	PF-1	N/A	FF-1	N/A	N/A	CC-1	HC-1	H-1	390	100	70	1, 2, 3, 4

NOTES:
1. SINGLE POINT POWER
2. TEFC, PREMIUM EFFICIENCY INVERTER DUTY MOTORS WITH SHAFT GROUNDING
3. ALL MOTORS ON VARIABLE FREQUENCY DRIVES WITH IEEE 519 LINE FILTERS
4. HUMIDIFIER MANIFOLD AND STEAM GENERATOR BY OTHERS

CHILLED WATER COOLING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW	MAX FACE VELOCITY	APD	EAT		LAT		TOTAL CAPACITY	SENSIBLE CAPACITY	CHILLED WATER				REMARKS
							Db	Wb	Db	Wb			FLOW	EWT	LWT	WPD	
				CFM	FPM	IN WG	°F	°F	°F	°F	MBH	MBH	GPM	°F	°F	FT	
CC-1	PENTHOUSE	BUILDING	AHU-15	17270	500	0.7	82	69	55	55	687	478	86	45	61	11	1

NOTE:
1. THE COOLING COIL FIN SPACING SHALL NOT EXCEED 132 FINS PER FOOT [400 FINS PER METER].

HOT WATER HEATING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	APPLICATION	AIR FLOW	MAX FACE VELOCITY	APD	TEMPERATURES		TOTAL MIN CAPACITY	HOT WATER				% GLYCOL	REMARKS
								EAT	LAT		FLOW	EWT	LWT	WPD		
					CFM	FPM	IN WG	°F	°F	MBH	GPM	°F	°F	FT		
HC-1	PENTHOUSE	BUILDING	AHU-15	PREHEAT	17270	500	0.1	41	56	276	5	130	90	1	0	

FAN SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW	ESP	FAN							MOTOR ELECTRICAL						REMARKS
						TYPE	MIN EFFECTIVE PLUME HEIGHT (FT)	MIN NOZZLE VELOCITY (FT/MIN)	CLASS	DIAMETER	MIN % EFF	DRIVE	FAN MAX RPM	NOMINAL POWER		PHASE	VOLT	RPM	SPEED CONTROL	
										IN				BHP	HP					
				CFM	IN															
SF-1	PENTHOUSE	BUILDING	AHU-15	7500	2.5	DIRECT-DRIVE PLENUM	-	-	II	22.25	67%	DIRECT	2191	10.1	15	3	208	1800	VARIABLE	1, 2, 3, 4
SF-2	PENTHOUSE	BUILDING	AHU-15	7500	2.5	DIRECT-DRIVE PLENUM	-	-	II	22.25	67%	DIRECT	2191	10.1	15	3	208	1800	VARIABLE	1, 2, 3, 4
RF-1	PENTHOUSE	BUILDING	AHU-15	7500	2.5	DIRECT-DRIVE PLENUM	-	-	I	22.25	68%	DIRECT	1617	5.8	7.5	3	208	1800	VARIABLE	1, 2, 3, 4
RF-2	PENTHOUSE	BUILDING	AHU-15	7500	2.5	DIRECT-DRIVE PLENUM	-	-	I	22.25	68%	DIRECT	1617	5.8	7.5	3	208	1800	VARIABLE	1, 2, 3, 4
EF-1	ROOF	RESTOOMS/JANITOR/ SOILED UTILITY	GENERAL EXHAUST	2120	1	UPBLAST CENTRIFUGAL	-	-	I	14.625	33%	BELT	1563	0.78	1	3	208	1725	VARIABLE	1, 2, 3, 4, 5
EF-2	ROOF	ISOLATION EXAM ROOM	ISOLATION EXHAUST	390	1.5	HIGH PLUME BLOWER	17	4,333	I	11.187	6%	BELT	3268	0.86	1	3	208	3600	VARIABLE	1, 2, 3, 4, 5, 6
EF-3	ROOF	WAITING/NURSE TRIAGE	WAITING/NURSE TRIAGE EXHAUST	2170	2	UPBLAST CENTRIFUGAL	-	-	I	18.25	49%	BELT	1669	1.47	2	3	208	1725	VARIABLE	1, 2, 3, 4, 5, 6
EF-4	ROOF	DENTAL LAB	LAB EXHAUST	785	1.5	UPBLAST CENTRIFUGAL	-	-	I	11.125	36%	BELT	2574	0.55	0.75	3	208	1725	VARIABLE	1, 2, 3, 4, 5, 6
EF-5	PENTHOUSE	PENTHOUSE	PENTHOUSE EXHAUST	700	0.25	SIDEWALL PROPELLER	-	-	I	12	46%	DIRECT	1550	0.05	0.1	1	120	1550	CONSTANT	1, 2, 3, 4

NOTES:
1. SELECTION BASED ON AN ALTITUDE OF 361 FT.
2. TEFC, PREMIUM EFFICENCY MOTOR
3. VFD WITH IEEE 519 LINE FILTER
4. SHAFT GROUNDING
5. FACTORY CURB WITH MOTORIZED SHUTTER
6. 1" VIBRATION ISOLATORS, RESTRAINED SPRING TYPE WITH NEOPRENE SNUBBERS

GAS-FIRED ATMOSTPHERIC STEAM HUMIDIFIER SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SEVICE	HUMIDIFIER TYPE	AIR FLOW	# OF MANIFOLDS	EAT		LAT		SOURCE	STEAM FLOW	CONTROL TYPE	ELECTICAL			REMARKS
						Db	Wb	DP	DP				AMPS	PHASE	VOLT	
				CFM		°F	°F	°F	°F		LBS/HR					
H-1	PENTHOUSE	AHU-15	BOTTOM FEED MANIFOLD	10220	1	37.5	52	47	55	NG	200	MODULATING	3.7	1	120	1, 2, 3, 4, 5, 6, 7, 8, 9

NOTES:
1. SHORT ABSORPTION DISTANCE MANIFOLD
2. DIRECT VENT KIT
3. HIGH HUMIDITY ALARM WITH HIGH LIMIT DUCT STAT
4. SINGLE MODULATING DEMAND SIGNAL BY OTHERS
5. BACNET BMS GATEWAY
6. AIR PROVING SWITCH
7. FLOOR STAND KIT
8. 5 MICRON INLINE FILTER
9. INTEGRAL DRAIN COOLER

HOT WATER HEATING BOILER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	FLUID				BOILER		% EFF	NATURAL GAS SUPPLY PRESSURE	FUEL	RELIEF VALVE SETTING	ELECTRICAL		DIMENSIONS			REMARKS
					FLOW	EWT	LWT	WPD	OUTPUT GENERATED	MAX HEAT INPUT					PHASE	VOLT	LENGTH	WIDTH	HEIGHT	
					GPM	°F	°F	FT	MBH	MBH		IN WG		PSIG			IN	IN	IN	
B-1	PENTHOUSE	BUILDING	BUILDING HEATING HOT WATER	GAS FIRED HIGH EFFICIENCY CONDENSING	25	100	130	15	372	399	93	7	NG	50	1	120	27	16	43	1, 2, 3, 4
B-2	PENTHOUSE	BUILDING	BUILDING HEATING HOT WATER	GAS FIRED HIGH EFFICIENCY CONDENSING	25	100	130	15	372	399	93	7	NG	50	1	120	27	16	43	1, 2, 3, 4

NOTES:
1. INTEGRAL PRIMARY PUMP, PREMIUM EFFICIENCY MOTOR
2. CONDENSATE NEUTRALIZATION TANK
3. SINGLE POINT POWER
4. BACNET GATEWAY

AIR COOLED CHILLER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	CAPACITY	MAX kW/TON	MIN COP	MAX IPLV (kW/TON)	EVAPORATOR					CONDENSER	COMPRESSOR MOTOR				CONDENSER FAN MOTORS				ELECTRICAL				DIMENSIONS			REMARKS
								FLOW	EWT	LWT	MAX WPD	FOULING FACTOR	AMBIENT OA TEMP	# COMP	HP	PHASE	VOLT	# FANS	NOMINAL POWER	PHASE	VOLT	MCA	MOP	PHASE	VOLT	LENGTH	WIDTH	HEIGHT	
				TONS				GPM	°F	°F	FT		°F						HP							IN	IN	IN	
CH-1	ROOFTOP	BUILDING	SCROLL	60	1.1	3.2	14.4	87	60	44	7.5	0.0001	95	4	20	3	208	6	10	3	208	257	300	3	208	150	89	85	1, 2, 3, 4, 5, 6

NOTES
1. OUTDOOR CONSTRUCTION SUITABLE FOR CONTINUOUS DUTY TO 9 DEGREES F
2. NEMA 3R ELECTRICAL ENCLOSURES
3. HAIL GUARDS
4. BACNET GATEWAY
5. SINGLE POINT POWER
6. PROVIDE ASHRAE TYPE 4 RESTRAINED SPRING VIBRATION ISOLATORS AT ALL CHILLER MOUNT POINTS. ISOLATORS SHALL HAVE SPRING DEFLECTOR, NEOPRENE CUP AND SNUBBER, HOT DIPPED GALVANIZED, RATED FOR IBC WIND LOADING CRITERIA, AND SIZED TO ACHIEVE > 95% ISOLATION EFFICIENCY INSTALLED.

AIR FILTER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	MERV RATING	AIR FLOW	APD		HOUSING TYPE	CARTRIDGES				REMARKS
						INITIAL	CHANGEOVER		#	SIZE		ARRANGEMENT	
					CFM	IN	IN			IN	[mm]		
PF-1	PENTHOUSE	BUILDING	AHU-15	8	15000	0.5	1	SIDE	8 3	20x20x2 24x12x2	[508x508x51] [610x305x51]	BOTTOM: 4x2 TOP: 3x1	
FF-1	PENTHOUSE	BUILDING	AHU-15	15	15000	0.5	1	SIDE	8 3	20x20x12 24x12x12	[508x508x305] [610x305x305]	BOTTOM: 4x2 TOP: 3x1	

EXPANSION TANK SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	APPROX SYSTEM VOLUME	SYSTEM TEMPERATURE RANGE		INITIAL PRESSURE IN TANK	MAX OPERATING PRESSURE	MIN VOLUME TANK	MIN BLADDER VOLUME	PIPE SIZE TO TANK	REMARKS
					MIN	MAX						
				GAL	°F	°F	PSIG	PSIG	GAL	GAL	IN	
ET-1	PENTHOUSE	CHILLED WATER	VERTICAL DIAPHRAGM	120	44	60	12	150	8	5	0.75	
ET-2	PENTHOUSE	HEATING HOT WATER	VERTICAL DIAPHRAGM	130	100	130	12	125	45	23.2	1	

NOTES:
1. FLANGED
2. SEISMIC LEGS
3. 1/2" ELASTOMERIC INSULATION

BUFFER TANK SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	APPROX SYSTEM VOLUME	SYSTEM TEMPERATURE RANGE		INITIAL PRESSURE IN TANK	MAX OPERATING PRESSURE	MIN VOLUME TANK	PIPE SIZE TO TANK	REMARKS
					MIN	MAX					
				GAL	°F	°F	PSIG	PSIG	GAL	IN	
BT-1	PENTHOUSE	CHILLED WATER	BUFFER TANK	120	44	60	12	125	300	2	1, 2, 3

NOTES:
1. FLANGED
2. SEISMIC LEGS
3. 1/2" ELASTOMERIC INSULATION

AIR SEPARATOR SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	AIR SEPARATOR				REMARKS
				SIZE IN	FLOW	WPD	BUILT-IN STRAINER REQ'D	
				IN	GPM	FT		
AS-1	PENTHOUSE	CHILLED WATER	FULL FLOW TANGENTIAL	3	90	3	YES	
AS-2	PENTHOUSE	HEATING HOT WATER	FULL FLOW TANGENTIAL	2.5	50	1.5	YES	

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Drawing Title: **SCHEDULES**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351** (CANNON DESIGN PROJECT NO. 03850.05)

Building Number

Drawing Number: **MH-502**

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VA FORM 08-6231

FOUR PIPE FAN COIL UNIT SCHEDULE

MARK	LOCATION	TYPE	FAN AIR FLOW	EXTERNAL APD	COOLING REQUIREMENTS							HEATING REQUIREMENTS					FAN MOTOR				DIMENSIONS			REMARKS
					MIN SENS CAPACITY	MIN TOTAL CAPACITY	EAT		FLOW	EWT	WPD	MIN CAPACITY	EAT Db	FLOW	EWT	WPD	POWER	PHASE	VOLT	RPM	LENGTH	WIDTH	HEIGHT	
							Db	Wb																
			CFM	IN WG	MBH	MBH	°F	°F	GPM	°F	FT	MBH	°F	GPM	°F	FT	HP				IN	IN	IN	
FCU-2	PENTHOUSE	HORIZONTAL EXPOSED	355	0.25	11	16	80	67	3.5	44	7	19	60	2	130	11	1	1	120	1475	36	10	29	1

NOTES:
1. PROVIDE 1" MERV 15 REMOVABLE FILTER.

SPLIT SYSTEM AIR CONDITIONER HEAT PUMP SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	INDOOR EVAPORATOR UNIT SERVED	TYPE	TOTAL SUPPLY AIR FLOW	MIN. OUTSIDE AIR FLOW	EXT STATIC PRESSURE	COOLING CAPACITY									REMARKS
								MIN TOTAL CAPACITY	MIN SENS CAPACITY	MIN SEER	EAT		OSA DESIGN TEMP	COMP KW	MCA	PHASE	VOLT	
											Db	Wb						
					CFM	CFM	IN	MBH	MBH		°F	°F	°F					
CU-1	ROOF	G091 ELEVATOR MACHINE ROOM	EU-1	MINI-SPLIT WALL MOUNTED	795	0	0.25	24	24	18	80	67	[72]	3	20	1	208	1
CU-2	ROOF	1203 TELE/DATA ROOM	EU-2	MINI-SPLIT WALL MOUNTED	795	0	0.25	33	33	16	80	67	[72]	4.1	20	1	208	1
CU-3	ROOF	1232A BIOMED ELECT CLOSET	EU-3	MINI-SPLIT DUCTED	210	0	0.25	21	21	17	80	67	[72]	2	20	1	208	1

NOTES:
1. INDOOR UNIT SUPPLIED ELECTRICALLY BY OUTDOOR UNIT

PUMP SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	CIRCULATING FLUID					MIN % EFF	ELECTRICAL MOTOR					REMARKS
					FLUID	FLOW	HEAD	NPSH AVAILABLE	TEMPERATURE		NOMINAL POWER	PHASE	VOLT	MAX RPM	SPEED CONTROL	
						GPM	FT	FT	°F		HP					
CHWP-1	PENTHOUSE - ROOF	BUILDING	CHILLED WATER	IN-LINE	WATER	90	70	9	44	84	5	3	208	1800	VARIABLE	1, 2, 3, 4, 5
CHWP-2	PENTHOUSE - ROOF	BUILDING	CHILLED WATER	IN-LINE	WATER	90	70	9	44	84	5	3	208	1800	VARIABLE	1, 2, 3, 4, 5
HWP-1	PENTHOUSE - ROOF	BUILDING	HEATING HOT WATER	IN-LINE	WATER	25	50	4	100	81.5	1.5	3	208	1800	VARIABLE	1, 2, 3, 4, 5
HWP-2	PENTHOUSE - ROOF	BUILDING	HEATING HOT WATER	IN-LINE	WATER	25	50	4	100	81.5	1.5	3	208	1800	VARIABLE	1, 2, 3, 4, 5
HWP-3	PENTHOUSE - ROOF	BUILDING	PREHEAT COIL CIRCULATOR PUMP	IN-LINE	WATER	25	50	4	100	81.5	1.5	3	208	1800	VARIABLE	1, 2, 3, 4, 5

NOTES:
1. TEFC
2. PREMIUM EFFICIENCY
3. INVERTER DUTY
4. SHAFT GROUNDING
5. VFD'S WITH IEEE 519 LINE FILTER

AIR FLOW CONTROL VALVE SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	SIZE	DESIGN AIR FLOW	MAX AIR FLOW	APD AT MAX AIR FLOW	CONTROL TYPE	CONNECT TO ECC	APPLICATION	REMARKS
				IN	CFM	CFM	IN WG				
CVE-001	LL007 RECEPTION/WAITING	AHU-1	EXHAUST VALVE	12	1900	1900	0.5	CV	YES	ER WAITING EXHAUST	
CVE-002	LL012 NURSE TRIAGE	AHU-1	EXHAUST VALVE	6	270	270	0.5	CV	YES	NURSE TRIAGE EXHAUST	
CVE-003	LL002 ISOLATION EXAM LL021 PATIENT TOILET	AHU-1	EXHAUST VALVE	6	390	390	0.5	CV	YES	ISOLATION EXAM EXHAUST	
CVE-101	1211 DENTAL LAB	AHU-1	EXHAUST VALVE	8	780	780	0.5	CV	YES	LAB EXHAUST	

HOT WATER UNIT HEATER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE UNIT	AIR FLOW	MIN CAPACITY	TEMPERATURES			FLOW	WPD	MOTOR			DIMENSIONS			REMARKS
						EAT	EWT	LWT			PHASE	VOLT	AMPS	LENGTH	WIDTH	HEIGHT	
				CFM	MBH	°F	°F	°F	GPM	FT				IN	IN	IN	
UH-1	LL001 ENTRY VESTIBULE	VESTIBULE	VERTICAL RECESSED INVERTED FLOW CABINET	210	14.5	60	130	100	1	2	1	120	1	36	10	26	1, 2
UH-2	STAIR 9	STAIR	VERTICAL CABINET	210	14.5	60	130	100	1	4	1	120	1	36	10	26	1

NOTES:
1. PROVIDE 1" MERV 8 REMOVABLE FILTER.
2. PROVIDE PLUMBING ACCESS ON UNIT FACE.

ELECTRIC UNIT HEATER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE UNIT	MIN CAPACITY	ELECTRICAL		DIMENSIONS	REMARKS
					PHASE	VOLT	LENGTH	
				WATTS			IN	
UH-3	LL002 LOBBY	LOBBY	BASEBOARD UNIT HEATER	750	1	120	36	

NOTES:

SINGLE DUCT AIR TERMINAL UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR ROOM SERVED	SYSTEM AIR HANDLING	SIZE	AIR FLOW		EAT	ADDITIONAL SOUND ATTUNATION REQUIRED	CONTROL TYPE	HW REHEAT	PERIMETER SUPPLEMENTAL HEAT LINK	REMARKS
					MAX	MIN						
					CFM	CFM	°F			MBH		
VAV-001	LL019 WOMENS EXAM	AHU-15	VAV	6	275	165	55	NONE	VAV	6.5	NONE	
VAV-002	LL018 MULTI-PURPOSE EXAM/PROCEDURE	AHU-15	VAV	6	285	285	55	NONE	CV	8	NONE	
VAV-003	LL023 MENTAL HEALTH EXAM	AHU-15	VAV	6	365	325	55	NONE	VAV	9	NONE	
VAV-004	LL022 ISOLATION EXAM	AHU-15	VAV	6	290	290	55	NONE	CV	8	NONE	
VAV-005	LL025 SOILED UTILITY LL026 CLEAN STORAGE SUPPLY	AHU-15	VAV	6	200	200	55	NONE	CV	5.5	NONE	
VAV-006	LL030 MULTIPURPOSE ROOM	AHU-15	VAV	8	550	310	55	NONE	VAV	10.5	NONE	
VAV-007	LL027 NURSE STATION	AHU-15	VAV	6	145	145	55	NONE	CV	4	NONE	
VAV-008	LL028 MEDICATION	AHU-15	VAV	6	70	70	55	NONE	CV	2	NONE	
VAV-009	LL012 NURSE TRIAGE	AHU-15	VAV	6	170	170	55	NONE	CV	5	NONE	
VAV-010	LL013 EXAM 1	AHU-15	VAV	6	165	140	55	NONE	VAV	4	NONE	
VAV-011	LL014 EXAM 2 LL015 EXAM 3	AHU-15	VAV	6	360	330	55	NONE	VAV	9	NONE	
VAV-012	LL016 PHYSICIAN/NURSE OFFICE	AHU-15	VAV	6	160	85	55	NONE	VAV	3	NONE	
VAV-013	LL042 CORRIDOR LL043 CORRIDOR	AHU-15	VAV	6	390	390	55	NONE	CV	11	NONE	
VAV-014	G090 LOBBY/WAITING LLST8 STAIR 8	AHU-15	VAV	8	780	535	55	NONE	VAV	14.5	NONE	
VAV-015	LL003 POLICE AND SECURITY LL004 SECURE HOLDING	AHU-15	VAV	6	290	250	55	NONE	VAV	9	NONE	
VAV-016	LL001 ENTRY VESTIBULE	AHU-15	VAV	6	410	180	55	NONE	VAV	8.5	NONE	
VAV-017	LL017 NURSE MANAGER OFFICE	AHU-15	VAV	6	175	85	55	NONE	VAV	4	NONE	
VAV-018	LL007 RECEPTION/WAITING	AHU-15	VAV	12	1590	1590	55	NONE	CV	43.5	NONE	
VAV101	1216 SHARED DENTIST OFFICE 1217 CHIEF OFFICE	AHU-15	VAV	6	515	230	55	NONE	VAV	8.5	NONE	
VAV102	1218 TREATMENT OPERATORY #3 1219 TREATMENT OPERATORY #4	AHU-15	VAV	8	515	515	55	NONE	CV	14	NONE	
VAV103	1215 DENTAQL MECHANICAL 1220 CLEAN STORAGE	AHU-15	VAV	6	315	210	55	NONE	VAV	6.5	NONE	
VAV104	1224 MAS OFFICE AND WORKROOM	AHU-15	VAV	6	410	165	55	NONE	VAV	5	NONE	
VAV105	1221 DENTAL TECH WORKROOM	AHU-15	VAV	6	115	115	55	NONE	CV	3.5	NONE	
VAV106	1225 SHARED CONFERENCE 1234 CORRIDOR	AHU-15	VAV	8	720	320	55	NONE	VAV	8.5	NONE	
VAV107	1223 SOILED UTILITY	AHU-15	VAV	6	120	120	55	NONE	CV	3.5	NONE	
VAV108	1200 LOBBY LVL 1 STAIR 8	AHU-15	VAV	8	755	310	55	NONE	VAV	10	NONE	
VAV109	1202 WAITING	AHU-15	VAV	10	840	355	55	NONE	VAV	10	NONE	
VAV110	LL002 LOBBY LL005 CORRIDOR	AHU-15	VAV	10	980	460	55	NONE	VAV	17	NONE	
VAV111	1204 LARGE TREATMENT OPERATORY #1 1205 TREATMENT OPERATORY #2	AHU-15	VAV	8	735	735	55	NONE	CV	20	NONE	
VAV-113	1206 DENTAL HYGIENE #1 1207 DENTAL HYGIENE #2	AHU-15	VAV	8	630	280	55	NONE	VAV	8	NONE	
VAV-114	1208 X-RAY #1, 1209 TECH 1210 X-RAY #2	AHU-15	VAV	6	305	250	55	NONE	VAV	7	NONE	
VAV-115	1212 DENTAL LAB STORAGE 1213 STAFF AREA	AHU-15	VAV	6	315	210	55	NONE	VAV	6.5	NONE	
VAV-116	1201 RECEPTION/CHECK-IN	AHU-15	VAV	6	120	120	55	NONE	CV	3.5	NONE	
VAV-117	1211 DENTAL LAB	AHU-15	VAV	8	680	680	55	NONE	CV	18.5	NONE	

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions: | Date

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Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

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Office of Construction and Facilities Management

Department of Veterans Affairs

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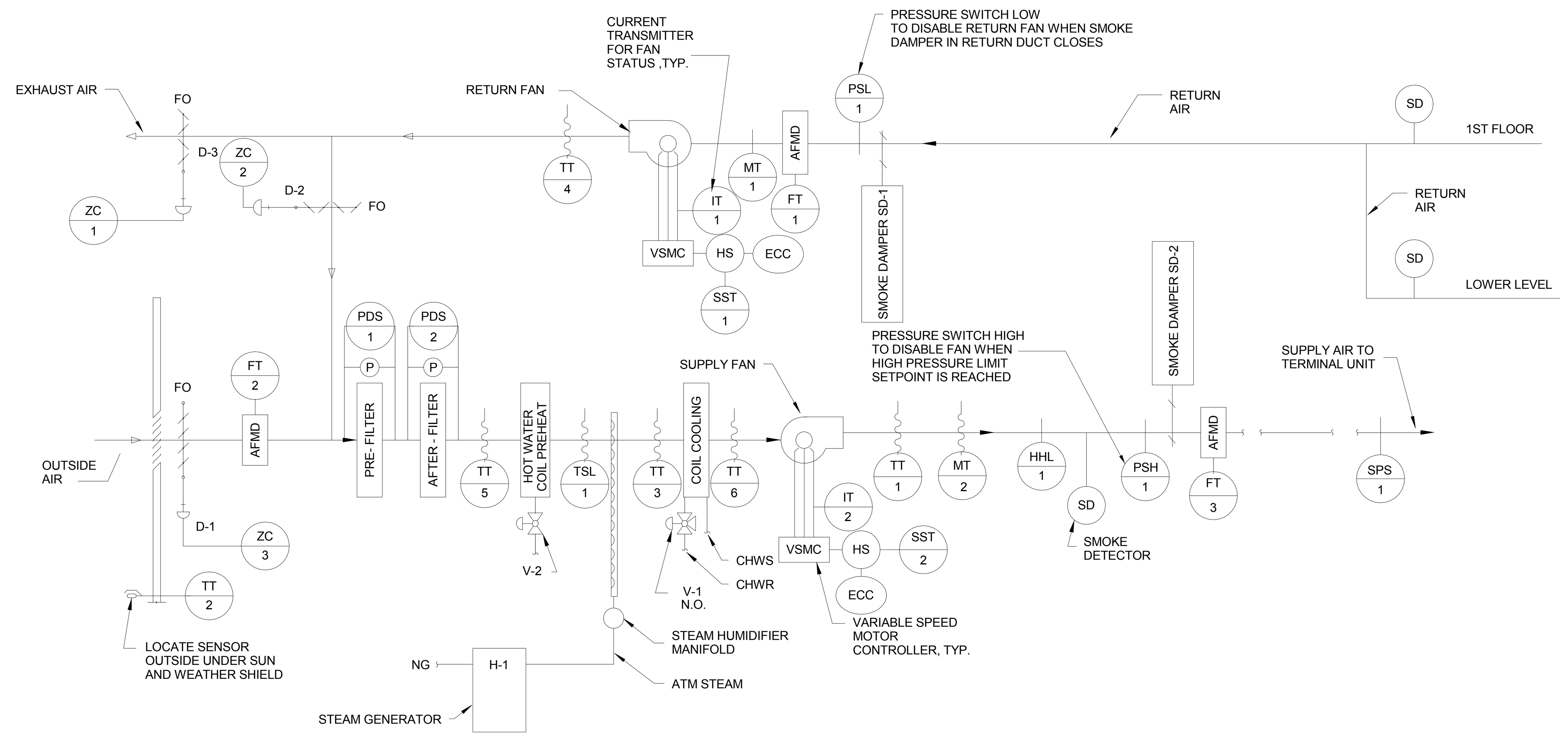


1C VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM

NTS

SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

SEQUENCE OF OPERATIONS

BUILDING AUTOMATION SYSTEM INTERFACE:
THE BUILDING MECHANICAL SYSTEM (BMS) SHALL SEND THE CONTROLLER OCCUPIED BYPASS, MORNING WARM-UP/PRE-COOL, OCCUPIED/UNOCCUPIED AND HEAT/COOL MODES. THE BMS SHALL ALSO SEND THE DISCHARGE AIR TEMPERATURE SETPOINT AND THE DUCT STATIC PRESSURE SETPOINT. IF A BMS IS NOT PRESENT, OR COMMUNICATION IS LOST WITH THE BMS THE CONTROLLER SHALL OPERATE USING DEFAULT MODES AND SETPOINTS.

OCCUPIED:
DURING OCCUPIED PERIODS, THE SUPPLY AND RETURN FAN SHALL RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS AND PRESSURIZATION AS SHOWN ON THE DRAWINGS. THE CHILLED WATER AND HOT WATER VALVES SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. IF ECONOMIZING IS ENABLED THE OUTSIDE AIR DAMPER SHALL ALSO MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. IF THE DISCHARGE AIR TEMPERATURE SENSOR FAILS, THE CHILLED WATER AND HOT WATER VALVES SHALL CLOSE AND AN ALARM SHALL BE ANNUNCIATED AT THE BMS.

UNOCCUPIED:
WHEN THE SPACE TEMPERATURE IS BELOW THE UNOCCUPIED HEATING SETPOINT OF 60.0 DEG. F (ADJ.) THE SUPPLY AND RETURN FAN SHALL START, THE OUTSIDE AIR DAMPER SHALL REVERT TO MINIMUM POSITION, AND THE HOT WATER VALVE SHALL OPEN. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT OF 60.0 DEG. F (ADJ.) PLUS THE UNOCCUPIED DIFFERENTIAL OF 4.0 DEG. F (ADJ.) THE SUPPLY AND RETURN FAN SHALL STOP AND THE HOT WATER VALVE SHALL CLOSE.
WHEN THE SPACE TEMPERATURE IS ABOVE THE UNOCCUPIED COOLING SETPOINT OF 85.0 DEG. F (ADJ.) THE SUPPLY AND RETURN FAN SHALL START, THE OUTSIDE AIR DAMPER SHALL MODULATE IF ECONOMIZING IS ENABLED, AND REMAIN AT MINIMUM POSITION IF ECONOMIZING IS DISABLED, AND THE CHILLED WATER VALVE SHALL OPEN. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED COOLING SETPOINT OF 85.0 DEG. F (ADJ.) MINUS THE UNOCCUPIED DIFFERENTIAL OF 4.0 DEG. F (ADJ.) THE SUPPLY AND RETURN FAN SHALL STOP, THE CHILLED WATER VALVE SHALL CLOSE AND THE OUTSIDE AIR DAMPER SHALL REVERT TO MINIMUM POSITION.

OPTIMAL START:
THE BMS SHALL MONITOR THE SCHEDULED OCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS. THE CONTRACTOR SHALL INPUT INITIAL OCCUPANCY SCHEDULE.

MORNING WARM-UP MODE:
DURING OPTIMAL START, IF THE AVERAGE SPACE TEMPERATURE IS BELOW THE OCCUPIED HEATING SETPOINT, A MORNING WARM-UP MODE SHALL BE ACTIVATED. WHEN MORNING WARM-UP IS INITIATED, THE BMS SHALL ENABLE THE HEATING AND SUPPLY FAN. THE OUTSIDE AIR DAMPER SHALL REMAIN AT MINIMUM POSITION. WHEN THE SPACE TEMPERATURE REACHES THE OCCUPIED HEATING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

PRE-COOL MODE:
DURING OPTIMAL START, IF THE AVERAGE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT, PRE-COOL MODE SHALL BE ACTIVATED. WHEN PRE-COOL IS INITIATED THE UNIT SHALL ENABLE THE FAN AND COOLING OR ECONOMIZER. THE OUTSIDE AIR DAMPER SHALL REMAIN AT MINIMUM POSITION UNLESS ECONOMIZING. WHEN THE SPACE TEMPERATURE REACHES OCCUPIED COOLING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

OPTIMAL STOP:
THE BMS SHALL MONITOR THE SCHEDULED UNOCCUPIED TIME, OCCUPIED SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL STOP OCCURS. WHEN THE OPTIMAL STOP MODE IS ACTIVE THE UNIT CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT. OUTSIDE AIR DAMPER SHALL REMAIN ENABLED TO PROVIDE VENTILATION AND BUILDING PRESSURIZATION REQUIREMENTS.

OCCUPIED BYPASS:
THE BMS SHALL MONITOR THE STATUS OF THE “ON” AND “CANCEL” BUTTONS OF THE SPACE TEMPERATURE SENSORS. WHEN AN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM ITS CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND THE UNIT SHALL MAINTAIN THE SPACE TEMPERATURE TO THE OCCUPIED SETPOINTS (ADJ.).

SUPPLY AIR TEMPERATURE RESET CONTROL:
THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET TO THE OPTIMAL SETPOINT COMMUNICATED BY THE BMS. THE BMS SHALL RESET THE SUPPLY AIR TEMPERATURE SETPOINT BASED ON THE CURRENT OUTSIDE AIR TEMPERATURE, BUT SHALL OVERRIDE THIS RESET FUNCTION AND RETURN THE SUPPLY AIR TEMPERATURE SETPOINT TO 55.0 DEG. F (ADJ.) IF MORE THAN TWO (ADJ.) ZONES BEGIN TO OVERHEAT. ALSO, THE BMS SHALL OVERRIDE THIS RESET FUNCTION WHENEVER OUTDOOR DEW POINT IS HIGHER THAN 60.0 DEG. F (ADJ.) OR INDOOR HUMIDITY IS HIGHER THAN 60% RH (ADJ.). IF THE SUPPLY AIR TEMPERATURE DROPS BELOW THE MINIMUM LIMIT, A LOW TEMPERATURE ALARM SHALL BE ANNUNCIATED AND THE UNIT SHALL SHUT DOWN. IF THE SUPPLY AIR TEMPERATURE RISES ABOVE THE MAXIMUM LIMIT, A HIGH TEMPERATURE ALARM SHALL BE ANNUNCIATED.

ECONOMIZER:
THE DISCHARGE AIR TEMPERATURE SENSOR SHALL MEASURE THE DRY BULB TEMPERATURE OF THE AIR LEAVING THE EVAPORATOR COIL WHILE ECONOMIZING. WHEN ECONOMIZING IS ENABLED AND THE UNIT IS OPERATING IN THE COOLING MODE, THE ECONOMIZER DAMPER SHALL BE MODULATED BETWEEN ITS MINIMUM POSITION AND 100% TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. THE ECONOMIZER DAMPER SHALL MODULATE TOWARD MINIMUM POSITION IN THE EVENT THE MIXED AIR TEMPERATURE FALLS BELOW THE LOW TEMPERATURE LIMIT SETTING. ENABLE THE ECONOMIZER WHEN THE OUTSIDE AIR FALLS TO 65 DEG. F (ADJ.) OR BELOW. DISABLE THE ECONOMIZER WHEN THE OUTSIDE AIR TEMPERATURE RISES TO 68 DEG. F (ADJ.).

SUPPLY FAN:
THE FAN SHALL RUN CONTINUOUSLY TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS, AND ITS SPEED SHALL BE MODULATED TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. THE DUCT STATIC PRESSURE SETPOINT SHALL BE SENT BY THE BAS AND SHALL BE RESET BETWEEN THE MINIMUM AND MAXIMUM STATIC PRESSURE LIMITS TO MAINTAIN THE MINIMUM DIFFERENTIAL PRESSURE REQUIREMENTS IN THE AREAS DESIGNATED ON THE DRAWINGS.

IF THE SUPPLY FAN FAILS TO PROVE STATUS FOR 30 SECONDS (ADJ.), THE FAN SHALL BE COMMANDED OFF, ALL VALVES SHALL CLOSE, AND AN ALARM SHALL BE ANNUNCIATED AT THE BMS. A MANUAL RESET SHALL BE REQUIRED TO RESTART THE FAN. A HARDWIRED, HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE ELECTRICALLY INTERLOCKED WITH THE VARIABLE SPEED DRIVE. IF THE HIGH STATIC PRESSURE CUT-OFF SWITCH IS TRIPPED THE FAN SHALL STOP, ALL VALVES SHALL CLOSE, AND AN ALARM WILL BE ANNUNCIATED AT THE BMS. A MANUAL RESET OF THE HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE REQUIRED TO RESTART THE FAN.

RETURN FAN:
THE RETURN FAN SHALL BE ON IN THE UNOCCUPIED MODE. WHEN THE CONTROLLER IS IN THE OCCUPIED MODE, THE RETURN FAN SHALL OPERATE CONTINUOUSLY AND MODULATE THE VFD TO MAINTAIN THE CFM SETPOINT AS MEASURED BY THE AIRFLOW MEASURING STATION. THE RETURN FAN CFM SETPOINT SHALL BE DETERMINED BY THE CFM OF THE SUPPLY AS MEASURED BY THE FAN INLET PROBES FAN MINUS A DIFFERENTIAL.

IF THE RETURN FAN FAILS TO PROVE STATUS FOR 30 SECONDS (ADJ.), THE FAN SHALL BE COMMANDED OFF, ALL VALVES SHALL CLOSE, AND AN ALARM SHALL BE ANNUNCIATED AT THE BMS. A MANUAL RESET IS REQUIRED TO RESTART THE FAN. A HARDWIRED, HIGH STATIC PRESSURE CUT-OFF SWITCH IS ELECTRICALLY INTERLOCKED WITH THE VARIABLE SPEED DRIVE. IF THE HIGH STATIC PRESSURE CUT-OFF SWITCH IS TRIPPED, THE FAN SHALL STOP, ALL VALVES SHALL CLOSE, AND AN ALARM SHALL BE ANNUNCIATED AT THE BMS. A MANUAL RESET OF THE HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE REQUIRED TO RESTART THE FAN. SUPPLY AND RETURN FANS ARE INTERLOCKED VIA SOFTWARE, A FAILURE OF EITHER SHALL DISABLE BOTH.

BUILDING PRESSURE CONTROL:
A DIFFERENTIAL PRESSURE TRANSDUCER SHALL ACTIVELY MONITOR THE DIFFERENCE IN PRESSURE BETWEEN THE BUILDING (INDOORS) AND OUTDOORS. IF THE BUILDING PRESSURE INCREASES ABOVE THE DESIRED SETPOINT, THE AHU CONTROLLER SHALL MODULATE THE EA DAMPER TO CONTROL BUILDING PRESSURE AT SETPOINT. IF THE BUILDING PRESSURE DECREASES BELOW THE DESIRED SETPOINT, THE CONTROLLER SHALL CLOSE THE EA DAMPER.

MIXED AIR LOW LIMIT:
THE INITIAL DAMPER OPENING RATE SHALL BE LIMITED TO 2% PER MINUTE (ADJ.) UNTIL THE DAMPER HAS REACHED ITS MINIMUM VENTILATION POSITION. THE OUTSIDE AIR DAMPER SHALL MODULATE TO A POSITION LESS THAN THE MINIMUM DAMPER POSITION IF THE MIXED AIR TEMPERATURE DROPS BELOW 50.0 DEG. F (ADJ.). IF THE MIXED AIR TEMPERATURE SENSOR FAILS AN ALARM SHALL BE ANNUNCIATED AT THE BAS AND THE OUTSIDE AIR DAMPER SHALL RETURN TO THE MINIMUM POSITION.

FREEZE PROTECTION:
A HARDWIRED, LOW LIMIT TEMPERATURE SWITCH SHALL BE ELECTRICALLY INTERLOCKED WITH THE VARIABLE SPEED DRIVE. IF THE LOW LIMIT TEMPERATURE SWITCH IS TRIPPED 38.0 DEG. F (ADJ.), ALL VALVES SHALL OPEN TO 100% (ADJUST PER CLIMATE), AND AN ALARM SHALL BE ANNUNCIATED AT THE BMS. A MANUAL RESET OF THE LOW LIMIT TEMPERATURE SWITCH SHALL BE REQUIRED TO RESTART THE FAN.

FILTER STATUS:
A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSES DURING NORMAL OPERATION A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

HUMIDIFICATION:
WHEN THE AIR HANDLING UNIT IS OPERATING AND IN OCCUPIED MODE, THE HUMIDIFIER MODULATES TO MAINTAIN THE RETURN HUMIDITY SET POINT OF 30% RH (ADJUSTABLE). HUMIDIFIER MODULATES OFF IF SUPPLY AIR HUMIDITY LEVELS EXCEED SET POINT. MT-1 MEASURES SPACE HUMIDITY AND RESETS DISCHARGE HUMIDITY SET POINT AS REQUIRED TO MAINTAIN SPACE HUMIDITY SET POINT. IF MT-2 MEASURES 85% RH (ADJUSTABLE) OR HIGHER, AN ALARM WILL BE GENERATED IN THE BMS. IF MT-2 SENSES RELATIVE HUMIDITY AT 90% (ADJUSTABLE) OR HIGHER, TURN HUMIDIFIER OFF AND SEND AN ALARM TO THE BMS.

SMOKE DETECTION:
UPON SMOKE DETECTION, BOTH SUPPLY AND RETURN FANS IN AHU-15 SHALL SHUT DOWN.

BUILDING: VA POPLAR BLUFF

SYSTEM: VAV AIR HANDLER

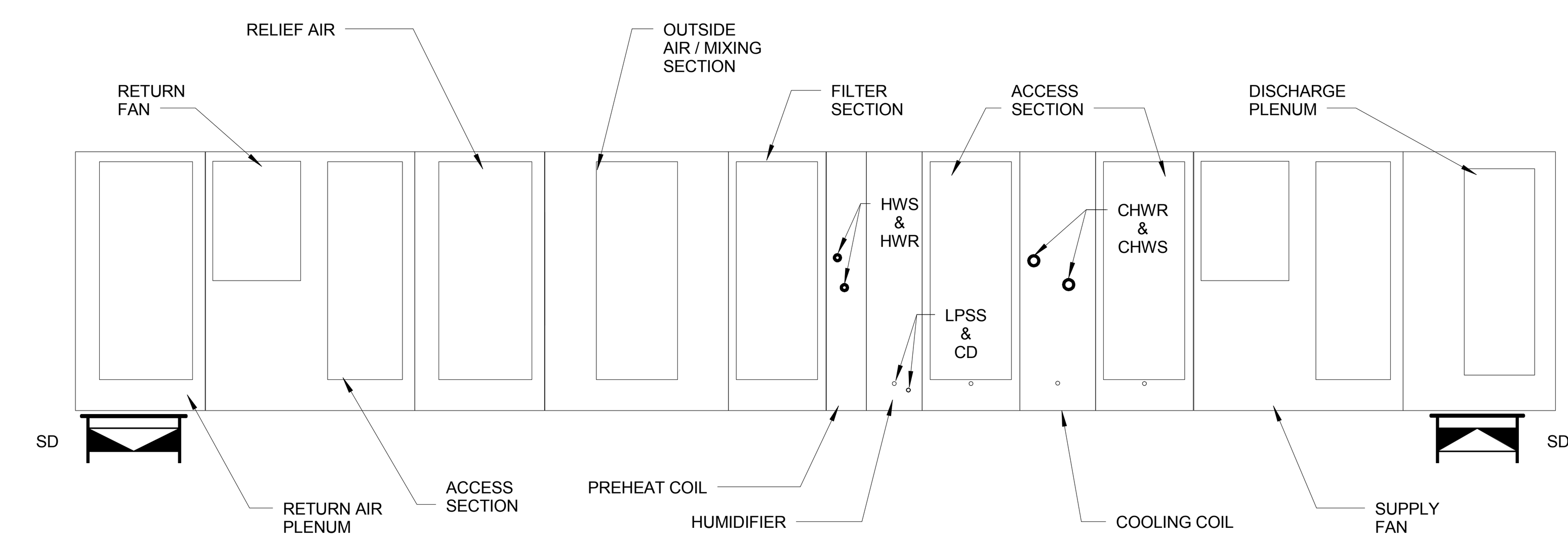
PAGE:

POINT LEGEND — SYSTEM OUTPUTS (BINARY, ANALOG) — SYSTEM INPUTS (BINARY, ANALOG) — SYSTEM SOFTWARE/CONTROL (ALARM PROCESSING, APPLICATION/FUNCTION)

SYSTEM COMPONENT	POINT ID	ABBREVIATION	PRIORITY/ADD-ALTERNATE NO.	–	ELECTRIC DEVICE	START/STOP	OPEN/CLOSE	–	SPEED COMMAND	VALVE POSITION	DAMPER POSITION	STATUS	ALARM	PRESSURE	HIGH HUMIDITY	HIGH STATIC PRESSURE	LOW TEMPERATURE	–	TEMPERATURE (TI)	PRESSURE	POSITION	FLOW	PERCENT	STATIC PRESSURE	CARBON MONOXIDE	HUMIDITY	VACUUM	Local Alarm Panel	Area Alarm Panel	Master Alarm Panel	HIGH LIMIT	LOW LIMIT	–	–	SCHEDULE START/STOP	FUNCTION	DUTY CYCLE	TEMPERATURE ECONOMIZER	ENTHALPY ECONOMIZER	TEMPERATURE RESET	DEMAND LIMITING	TEMPERATURE OVERRIDE	STATIC PRESSURE RESET	–	–	PRESSURE/VOLUME CONTROL	FAILURE MODE	SPACE TEMP. CONTROL	FULL COMMUNICATION	TRENDING	REMARKS
RETURN AIR TEMPURATURE	AI-1	RAT											○						○																																
RETURN AIR HUMIDITY	AI-2	RAH											○													○																								○	
RETURN AIF FLOW (CFM)	AI-3	RAF											○									○									○																			○	
MIXED AIR TEMPERATURE	AI-4	MAT											○						○																															○	
PRE-HEAT TEMPERATURE	AI-5	PHT											○						○																															○	
COOLING COIL TEMPERATURE	AI-6	CCT											○						○												○																			○	
DISCHARGE AIR TEMPERATURE	AI-7	DAT											○						○																					○										○	
DISCHARE STATIC PRESSURE	AI-8	DASP											○											○							○												○							○	
DISCHARGE AIR HUMIDITY	AI-9	DAH											○													○																								○	
SUPPLY AIR FLOW (CFM)	AI-10	SAF											○									○									○																			○	
OUTSIDE AIR TEMPERATURE	AI-11	OAT																	○																															○	
RETURN LOW PRESSURE	BI-1	RLP												○																																				○	
RETURN FAN STATUS	BI-2	RF-STS										○																																						○	
SUPPLY FAN STATUS	BI-3	SF-STS										○																																						○	
MIXED AIR LOW LIMIT	BI-4	TSL-1															○															○																		○	
STATIC PRESSURE HIGH LIMIT	BI-5	SPS-1														○															○																			○	
HUMIDITY HIGH LIMIT	BI-6	HHL-1													○																○																			○	
SUPPLY FAN VSMC ALARM	BI-7	SF-ALA											○																																					○	
RETURN FAN VSMC ALARM	BI-8	RF-ALA											○																																					○	
RETURN FAN VSMC	AO-1	RF-SPD							○																																								○	○	
SUPPLY FAN VSMC	AO-2	SF-SPD							○																																								○	○	
OUTSIDE AIR DAMPER	AO-3	OAD									○																												○											○	
RETURN AIR DAMPER	AO-4	RAD									○																												○											○	
EXHAUST AIR DAMPER	AO-5	EAD									○																												○											○	
PRE-HEAT VALVE V-2	AO-7	PHT-V1								○																																								○	
COILING VALVE V-1	AO-8	CLG-V1								○																																								○	
STEAM HUMIDIFIER	AO-9	HUM							○																																									○	
RETURN FAN START/STOP	BO-1	RF-SST				○																													○															○	
SUPPLY FAN START/STOP	BO-2	SF-SST				○																													○															○	

6C POINTS LIST FOR VAV AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

NTS



6E AHU-15 DIAGRAM

NTS

CLARIFICATION NOTES FOR CONTROL DRAWINGS:

1. IF BMS POWER REQUIREMENTS EXCEED CIRCUIT CAPACITY OR CIRCUIT QUANTITY AS PROVIDED BY THE CONTRACT DOCUMENTS, THE BMS CONTRACTOR OR THEIR SUBCONTRACTOR SHALL THEN EXTEND ADDITIONAL POWER WIRING, COMPLETE WITH REQUIRED BREAKERS, FROM AN ELECTRICAL PANEL, AS APPROVED BY THE PROFESSIONAL, AT NO ADDITIONAL COST TO THE OWNER.
2. WHERE MULTIPLE SMOKE, FIRE/SMOKE, CONTROLS/FIRE/SMOKE, OR CONTROL DAMPER SECTIONS ARE INSTALLED, THE END SWITCHES SHALL BE WIRED AND MONITORED AS ONE INPUT FOR "OPEN POSITION" AND ONE INPUT FOR "CLOSED POSITION."
3. THE MONITORING OF THE SMOKE DETECTORS AND SUBSEQUENT "OPEN-CLOSE" CONTROL OF THE SMOKE, FIRE/SMOKE, AND CONTROL/FIRE/SMOKE DAMPERS SHALL BE BY THE FIRE ALARM SYSTEM AS PROVIDED UNDER DIVISION 28. THE AHU ISOLATION DAMPERS SHALL BE ADDITIONALLY CONTROLLED BY THE BMS SYSTEM SUCH THAT UPON A UNIT SHUT DOWN, THE BMS SHALL CLOSE THE ASSOCIATED ISOLATION DAMPERS.
4. AHU FIRE/SMOKE DAMPER, CONTROL/FIRE/SMOKE DAMPER, AND CONTROL DAMPER END SWITCH STATUSES SHALL BE MONITORED DIRECTLY BY THE BMS SYSTEM. THE END SWITCH STATUSES SHALL BE USED BY THE BMS SYSTEM AS REQUIRED TO PROVIDE MONITORING, ALARMING, AND TRENDING OF DAMPER POSITIONS OF THE ASSOCIATED SYSTEMS.
5. WHERE SUPPLY AIR DISCHARGE TEMPERATURE SENSORS ARE INDICATED DOWNSTREAM OF DUCT MOUNTED HEATING COILS ON THE CONTROL DRAWINGS, THE CONTRACTOR SHALL MOUNT THE TEMPERATURE SENSOR A MINIMUM OF SIX (6) FEET FROM THE COIL DISCHARGE.
6. THE BMS CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF ALL DDC CONTROL PANELS WITH THE MECHANICAL CONTRACTOR, THE ELECTRICAL CONTRACTOR, AND THE OWNER'S REPRESENTATIVE, SUCH COORDINATION SHALL TAKE PLACE PRIOR TO THE CONTRACTOR BEGINNING FIELD INSTALLATION WORK FOR THE BUILDING MANAGEMENT SYSTEM AND SHALL BECOME A MATTER OF RECORD IN THE JOB MEETING MINUTES FOR THE MEETING IMMEDIATELY PRECEDING THE START OF THE BUILDING MANAGEMENT SYSTEM INSTALLATION.

BMS GENERAL NOTES

1. THE BMS CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING COMPLETE DETAILED SEQUENCES OF OPERATION FOR EACH PIECE OF EQUIPMENT OR SYSTEM REGARDLESS OF THE COMPLETENESS AND CLARITY OF THE SEQUENCES IN THE CONTRACT DOCUMENTS. THESE DETAILED SEQUENCES SHALL ADDRESS ALL OPERATING MODES INCLUDING, BUT NOT LIMITED TO, NORMAL, FAILURE, FAILURE RECOVERY. THESE DETAILED SEQUENCES SHALL ALSO ADDRESS ALL SYSTEM INTERACTION AND OPERATION INTERFACES AND SHALL BE REQUIRED PRIOR TO BEGINNING IMPLEMENTATION OF THE APPLICATION SOFTWARE AND MMI PACKAGE. THE SEQUENCES OF OPERATIONS AS WRITTEN INFER CERTAIN ADDITIONAL FUNCTIONALITY IN ORDER TO ACCOMPLISH PROJECT INTENT. SOFTWARE REVIEW MEETINGS SHALL BE HELD WITH THE ENGINEER, OWNER, COMMISSIONING AGENT AND CONTROLS CONTRACTOR TO FINALIZE DETAILS PRIOR TO BEGINNING IMPLEMENTATION OF THE APPLICATION SOFTWARE AND MMI PACKAGE AND AGAIN AT REGULAR INTERVALS DURING INITIAL OPERATION OF THE SYSTEM.
2. ALL SET POINTS, PARAMETERS, ETC. DESIGNATED AS MANUAL ADJUSTABLE (I.E. ADJ.) IN THE SEQUENCES OF OPERATION SHALL BE DIRECTLY ADJUSTABLE FROM THE ASSOCIATED COLORGRAPHIC SCREEN OR A SEPARATE SET POINT SCREEN, THE LATTER BEING DIRECTLY ACCESSIBLE VIA A TRANSFER POINT ON THE ORIGINAL COLORGRAPHIC SCREEN. IT SHALL NOT BE NECESSARY TO LEAVE THE COLORGRAPHIC SCREEN PACKAGE IN ORDER TO MAKE THE ADJUSTMENTS. NO EXCEPTIONS.
3. ALL AIR SYSTEMS AND ALL WATER SYSTEMS SET POINT VALUES SHALL BE COORDINATED WITH THE TAB CONTRACTOR TO DETERMINE FINAL OPERATING PARAMETER SET POINTS. ALL HARDWIRED SAFETY SET POINTS SHALL BE FIELD VERIFIED WITH THE TAB CONTRACTOR.
4. THE NEW BMS SHALL CONNECT TO THE EXISTING BMS AND GRAPHICAL WORKSTATIONS FOR MONITORING AND CONTROLLING.

5F BMS GENERAL NOTES

NTS

7F CLARIFICATION NOTES FOR CONTROL DRAWINGS

NTS

CONSTRUCTION DOCUMENTS - FINAL BID DOCUMENTS

Revisions: Date

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Drawing Title: FLOW AND CONTROL DIAGRAMS

Approved: Project Director

Project Title: John J. Pershing VAMC Clinical & Urgent Care Addition

Location: Poplar Bluff, Missouri

Date: DEC 14, 2015 | Checked: MEM | Drawn: BE

Project Number: 657-351
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: MH-601

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Office of Construction and Facilities Management

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VA FORM 08-6231

CHILLED WATER SYSTEM SEQUENCE OF OPERATIONS

SEQUENCE OF OPERATIONS

SYSTEM GENERAL DESCRIPTION:
THE CHILLED WATER SYSTEM CONSISTS OF THE FOLLOWING:
ONE (1) CHILLER
TWO (2) CHILLED WATER PUMPS: ONE (1) ACTIVE AND ONE (1) STANDBY

THE BUILDING AUTOMATION SYSTEM (BAS) CONTROLLER PROVIDES STAND-ALONE CONTROL OR CONTROL FROM A HIGHER LEVEL BAS AND PROVIDES ACTIVE/STANDBY ASSIGNMENTS FOR THE CHILLED WATER PUMPS.

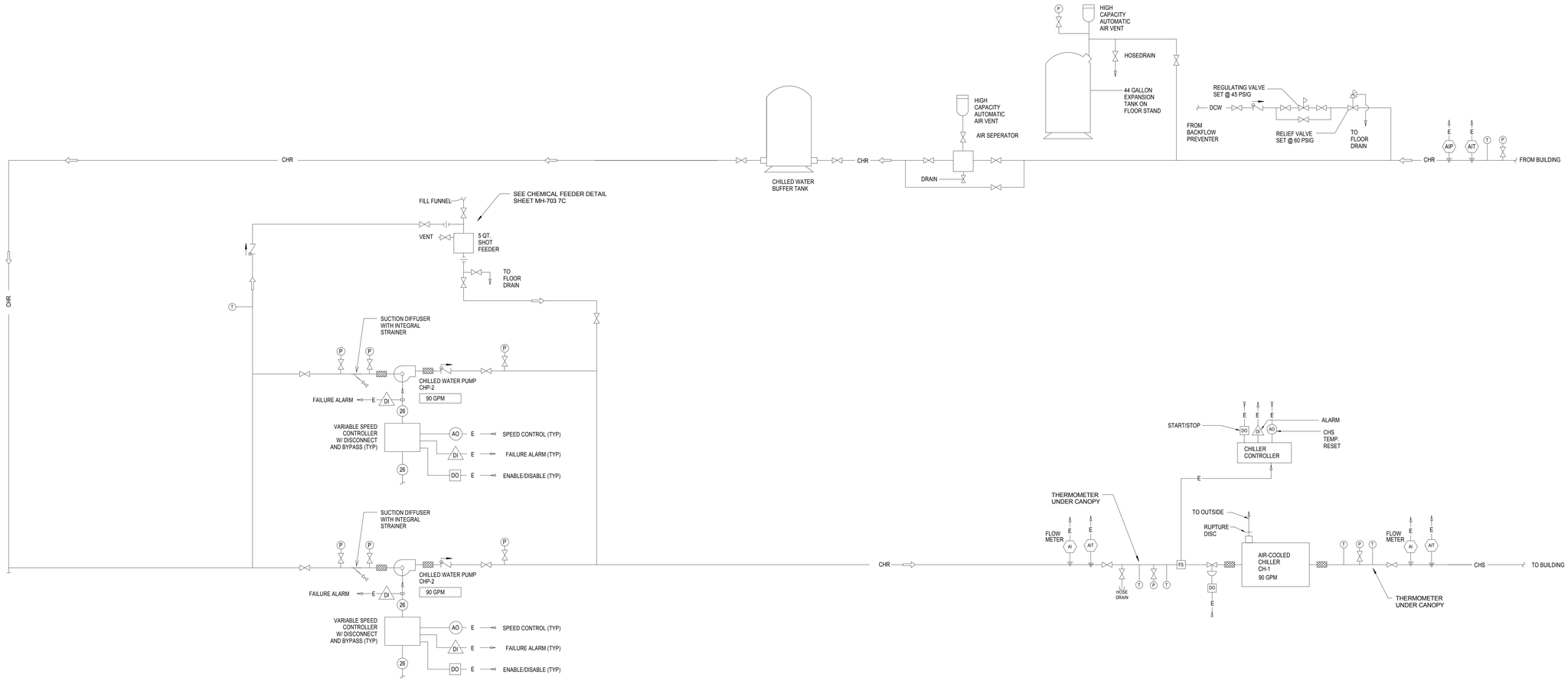
CHILLED WATER SYSTEM ENABLE/DISABLE:
THE CHILLED WATER SYSTEM SHALL BE ENABLED ON A CONTACT CLOSURE FROM ANY SYSTEM CHILLER. WHEN ENABLED, THE BAS CONTROLLER SHALL START THE ACTIVE CHILLED WATER PUMP. WHEN THE CHILLED WATER SYSTEM IS DISABLED, THE CHILLED WATER PUMPS SHALL BE OFF.

CHILLED WATER PUMP START/STOP:
THE BAS CONTROLLER SHALL START A CHILLED WATER PUMP THROUGH A CONTACT CLOSURE OF THE PUMPS MOTOR VFD ENABLE CONTACTS. THE CHILLED WATER PUMPS SHALL OPERATE AT CONSTANT SPEED.

CHILLED WATER PUMP STATUS:
THE BAS CONTROLLER SHALL DETECT CHILLED WATER PUMP RUN STATUS BY A CURRENT SWITCH.

CHILLED WATER PUMP ASSIGNMENTS:
THE CHILLED WATER PUMP ACTIVE/STANDBY ASSIGNMENTS SHALL BE ROTATED ON A WEEKLY SCHEDULE. THE SEQUENCE SHALL BE BASED ON CALCULATED RUN TIME WITH THE PUMP HAVING THE LEAST RUN TIME AS ACTIVE. FROM THE BAS AN OPERATOR SHALL BE ABLE TO MANUALLY CHANGE THE PUMP ASSIGNMENTS.

CHILLED WATER PUMP FAILURE:
IF THE ACTIVE START/STOP RELAY IS ENABLED AND THE CURRENT SWITCH STATUS IS OFF FOR MORE THAN 30 SECONDS (ADJ.), THE BAS CONTROLLER SHALL ANNUNCIATE A CHILLED WATER PUMP FAILURE ALARM TO THE BAS AND START THE NEXT PUMP IN THE SEQUENCE. ONCE THE PROBLEM HAS BEEN CORRECTED, THE OPERATOR SHALL BE ABLE TO CLEAR THE ALARM FAILURE FROM THE BAS AND MANUALLY RESETTING THE CHILLED WATER SYSTEM.



1F CHILLED WATER CONTROL DIAGRAM

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Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

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Drawing Number: **MH-602**
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VA FORM 08-6231

HEATING WATER SEQUENCE OF OPERATIONS

GENERAL DESCRIPTION:
THE HOT WATER SYSTEM CONSISTS OF TWO BOILERS, TWO INTEGRAL CONSTANT SPEED PRIMARY PUMPS, AND ASSOCIATED PUMPS. THE BOILERS SHALL BE PROVIDED WITH A MASTER BOILER CONTROL PANEL.

HEATING WATER SYSTEM ENABLE/DISABLE:
THE HEATING WATER SYSTEM WILL BE ENABLED YEAR ROUND FOR WINTER HEATING AND SUMMER REHEAT AND DISABLED MANUALLY AT THE BMS. WHEN ENABLED, THE BMS CONTROLLER STARTS THE LEAD HOT WATER DISTRIBUTION PUMP AND ENABLES THE LEAD BOILER. THE BOILER FACTORY CONTROL OPERATES THE BOILER TO MAINTAIN ITS LOCAL SUPPLY SETPOINT.

HOT WATER RESET:
THE HOT WATER SETPOINT IS LINEARLY RESET ACCORDING TO OUTDOOR AIR TEMPERATURE BY THE FOLLOWING SCHEDULE:

OUTSIDE AIR TEMPERATURE / HOT WATER SETPOINT
0°F (ADJ.) / 130°F (ADJ.)
60°F (ADJ.) / 100°F (ADJ.)
100°F (ADJ.) / 100°F (ADJ.)

BOILER CONTROL:
BOILERS 1 AND 2 SHALL OPERATE IN A LEAD/LAG SEQUENCE AS FOLLOWS. THE BOILER WITH THE LOWEST RUN TIME WILL BE ASSIGNED AS THE LEAD BOILER AND THE BOILER WITH THE HIGHEST RUN TIME WILL BE ASSIGNED AS THE LAG BOILER. ALL BOILER STAGING, SEQUENCING, AND SETPOINT CONTROL WILL BE BY THE BOILER MANUFACTURER. THE LEAD BOILER ISOLATION VALVE SHALL BE OPEN AT ALL TIMES AND SHALL BE CONTROLLED BY THE BOILER MASTER CONTROLLER.

HOT WATER DISTRIBUTION PUMP START/STOP:
THE BMS CONTROLLER STARTS A HOT WATER PUMP THROUGH A CONTACT CLOSURE OF THE PUMP'S VARIABLE FREQUENCY (VFD) DRIVE RUN-ENABLE CONTACTS. EACH HOT WATER DISTRIBUTION PUMP SHALL BE ASSIGNED TO A CHILLER, AND ENABLES WHEN THE CORRESPONDING CHILLER IS ENABLED.

HOT WATER DISTRIBUTION PUMP STATUS:
THE BMS CONTROLLER DETECTS HOT WATER PUMP RUN STATUS BY A VARIABLE FREQUENCY DRIVE CURRENT SWITCH.

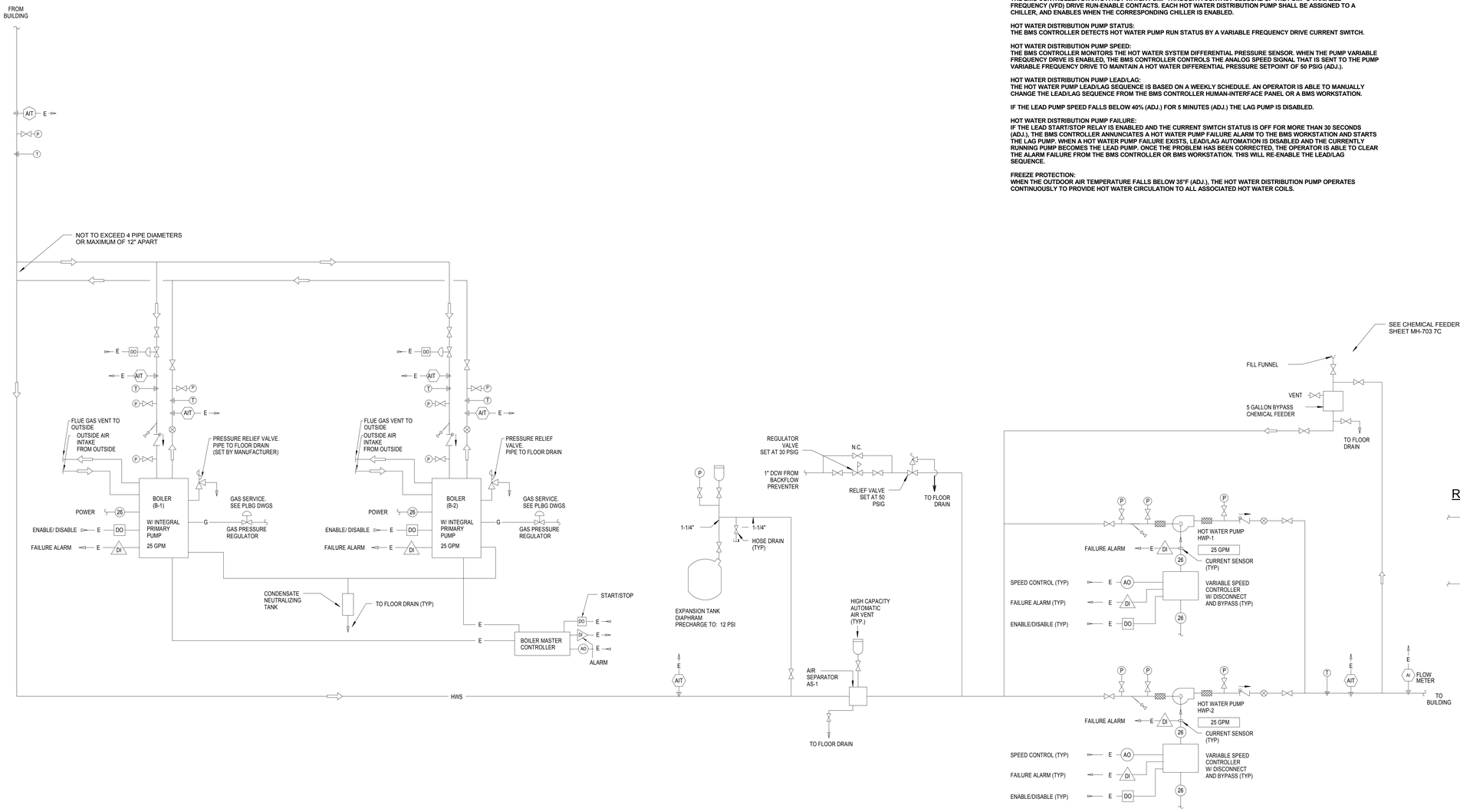
HOT WATER DISTRIBUTION PUMP SPEED:
THE BMS CONTROLLER MONITORS THE HOT WATER SYSTEM DIFFERENTIAL PRESSURE SENSOR. WHEN THE PUMP VARIABLE FREQUENCY DRIVE IS ENABLED, THE BMS CONTROLLER CONTROLS THE ANALOG SPEED SIGNAL THAT IS SENT TO THE PUMP VARIABLE FREQUENCY DRIVE TO MAINTAIN A HOT WATER DIFFERENTIAL PRESSURE SETPOINT OF 50 PSIG (ADJ.).

HOT WATER DISTRIBUTION PUMP LEAD/LAG:
THE HOT WATER PUMP LEAD/LAG SEQUENCE IS BASED ON A WEEKLY SCHEDULE. AN OPERATOR IS ABLE TO MANUALLY CHANGE THE LEAD/LAG SEQUENCE FROM THE BMS CONTROLLER HUMAN-INTERFACE PANEL OR A BMS WORKSTATION.

IF THE LEAD PUMP SPEED FALLS BELOW 40% (ADJ.) FOR 5 MINUTES (ADJ.) THE LAG PUMP IS DISABLED.

HOT WATER DISTRIBUTION PUMP FAILURE:
IF THE LEAD START/STOP RELAY IS ENABLED AND THE CURRENT SWITCH STATUS IS OFF FOR MORE THAN 30 SECONDS (ADJ.), THE BMS CONTROLLER ANNUNCIATES A HOT WATER PUMP FAILURE ALARM TO THE BMS WORKSTATION AND STARTS THE LAG PUMP. WHEN A HOT WATER PUMP FAILURE EXISTS, LEAD/LAG AUTOMATION IS DISABLED AND THE CURRENTLY RUNNING PUMP BECOMES THE LEAD PUMP. ONCE THE PROBLEM HAS BEEN CORRECTED, THE OPERATOR IS ABLE TO CLEAR THE ALARM FAILURE FROM THE BMS CONTROLLER OR BMS WORKSTATION. THIS WILL RE-ENABLE THE LEAD/LAG SEQUENCE.

FREEZE PROTECTION:
WHEN THE OUTDOOR AIR TEMPERATURE FALLS BELOW 35°F (ADJ.), THE HOT WATER DISTRIBUTION PUMP OPERATES CONTINUOUSLY TO PROVIDE HOT WATER CIRCULATION TO ALL ASSOCIATED HOT WATER COILS.



1F HEATING HOT WATER CONTROL DIAGRAM

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Building Number

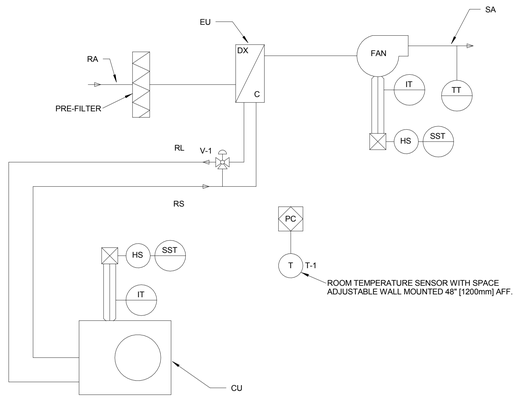
Drawing Number: **MH-603**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

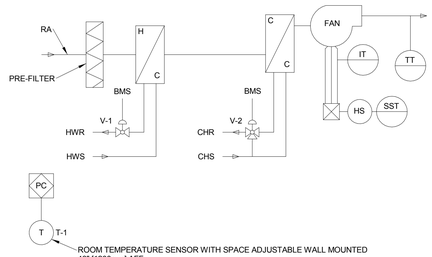
VA FORM 08-6231

DUCTED & DUCTLESS MINI SPLIT MONITORING:
THE SPACE MONITOR SHALL MONITOR ROOM TEMPERATURE AND ALARM IF THE SPACE TEMPERATURE IS BELOW 65 DEG (ADJ) AND ABOVE 80 DEG (ADJ).

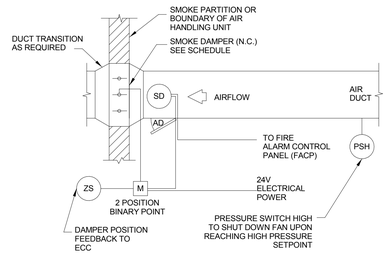


1C DUCTED & DUCTLESS MINI-SPLIT CONTROLS
NTS

FAN COIL SEQUENCE OF OPERATION (NONPATIENT ROOMS)
FAN COIL SHALL OPERATE ON A SCHEDULE AS SET BY ECC. FAN SHALL RUN CONTINUOUSLY IN OCCUPIED MODE. FAN STATUS SHALL BE MONITORED AND AN ALARM MESSAGE SHALL BE GENERATED IN THE EVENT THE UNIT FAILS TO RUN BETWEEN THE RANGE OF 70°-75° SPACE TEMPERATURE BOTH V-1 & V-2 SHALL BE CLOSED. UPON RISE IN TEMPERATURE ABOVE 75° V-2 SHALL MODULATE OPEN TO MAINTAIN 75° F. UPON FALL IN TEMPERATURE BELOW 70° F. HEATING VALVE V-1 SHALL MODULATE TO OPEN TO MAINTAIN 70° F.



3C FOUR PIPE FAN COIL UNIT CONTROLS
NTS

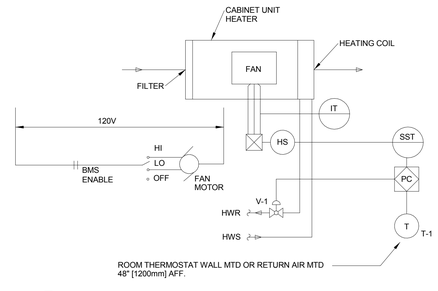


NOTE:
UPON DETECTION OF SMOKE BY THE SMOKE DETECTOR, THE SMOKE DAMPER SHALL CLOSE & SEND AN ALARM TO THE ECC.

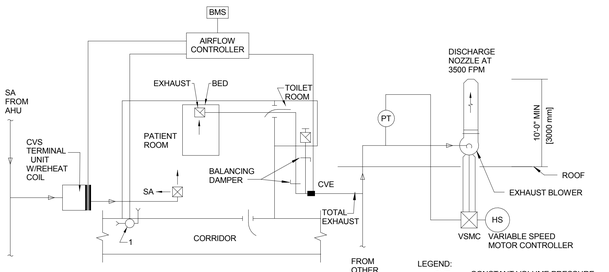
5C SMOKE & FIRE/SMOKE DAMPER CONTROL DIAGRAM
NTS

HOT WATER CABINET UNIT HEATER SEQUENCE

1. CABINET HEATER SHALL OPERATE ON A SCHEDULE AS SET BY THE ECC. FAN STATUS SHALL BE MONITORED AND AN ALARM MESSAGE GENERATED IN THE EVENT THE UNIT FAILS TO RUN. THE ROOM TEMP SETPOINT WILL BE 74° (ADJ). THE HOT WATER VALVE WILL BE ENABLED AS REQUIRED TO MAINTAIN SPACE TEMP SETPOINT. HI/LO/OFF SWITCH WILL ALLOW LOCAL FAN SPEED ADJUSTMENT.



7C HOT WATER CABINET UNIT HEATER CONTROLS
NTS

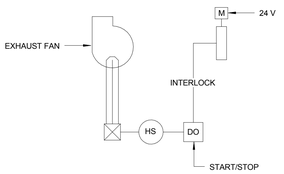


LEGEND:
CVE — CONSTANT VOLUME PRESSURE INDEPENDENT AIRFLOW CONTROL VALVE
CVS — CONSTANT VOLUME PRESSURE INDEPENDENT AIRFLOW CONTROL VALVE WITH REHEAT COIL

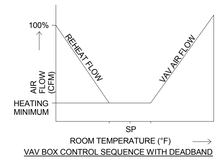
GENERAL NOTES:

1. MAINTAIN NEGATIVE AIR PRESSURE (0.02 INCH WATER COLUMN [2.5 PASCAL]) BETWEEN THE AII ROOM AND THE CORRIDOR BY MODULATING VALVE CVE TO MAINTAIN OFFSET SCHEDULED ON THE DRAWINGS. AII ROOMS SHALL HAVE A PERMANENTLY INSTALLED DEVICE AND/OR MECHANISM TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND THE CORRIDOR.
   A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER NEGATIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED. (STROBE LITE)
2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE AII ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.
3. LOCATE EXHAUST AIR REGISTER OVER THE PATIENT BED ON THE CEILING. AS AN ALTERNATE, THE EXHAUST AIR REGISTER CAN BE LOCATED ON THE WALL NEAR THE PATIENT HEAD, IF FEASIBLE.
4. LOCATE THE SUPPLY AIR OUTLET TO BLOW AIR TOWARDS THE OCCUPIED AREA.
5. PROVIDE A DEDICATED EXHAUST SYSTEM FOR THE AII ROOMS WITHOUT MIXING IT WITH ANY OTHER EXHAUST.

1E AIR SYSTEM FOR AIRBORNE INFECTIOUS ISOLATION ROOM (AII) (WITHOUT ANTEROOM)
NTS NEGATIVE PRESSURE

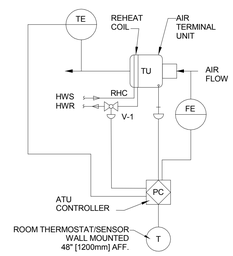


1F PENTHOUSE EXHAUST FAN CONTOLS
NTS

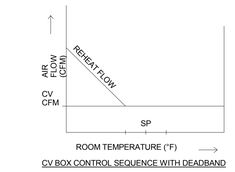


VAV BOX CONTROL SEQUENCE WITH DEADBAND

A. SET POINTS SHALL BE SET AS FOLLOWS:
   COOLING 75°F (ADJ)
   HEATING 70°F (ADJ)
   DEADBAND OF 5°F BIETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER SHALL MODULATE TO MINIMUM POSITION.
C. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V-1 SHALL MODULATE TO MAINTAIN SET POINT ± .5°F. THE ADJUSTABLE TOLERANCE OF ± .5°F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
D. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.

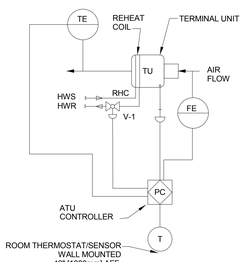


3F VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM
NTS



CV BOX CONTROL SEQUENCE WITH DEADBAND

A. SET POINTS SHALL BE SET AS FOLLOWS:
   COOLING 75°F (ADJ)
   HEATING 70°F (ADJ)
   DEADBAND OF 5°F BETWEEN HEATING AND COOLING SET POINTS SHALL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V-1 SHALL MODULATE TO MAINTAIN SET POINT ± .5°F.
   THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
C. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



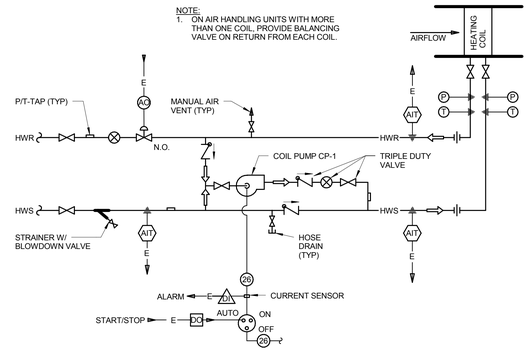
5F CONSTANT VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM
NTS

SEQUENCE OF OPERATION

1. UPON RISE IN SPACE NO2 LEVEL TO 15 PPM, SEND "LEVEL 1 - HIGH" ALARM TO BMS.
2. UPON CONTINUED RISE IN SPACE NO2 TO 25 PPM, SEND "LEVEL 2 - HIGH HIGH" ALARM TO BMS.
3. A LEVEL 2 ALARM REQUIRES A MANUAL RESET.

7D STORAGE ROOM NITROUS OXIDE SENSOR CONTROLS
NTS

NOTE:
1. ON AIR HANDLING UNITS WITH MORE THAN ONE COIL, PROVIDE BALANCING VALVE ON RETURN FROM EACH COIL.



7F HEATING COIL WITH FREEZE PROTECTION PUMP
1/8" = 1'-0"

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Location: **Poplar Bluff, Missouri**
Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**
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Department of Veterans Affairs

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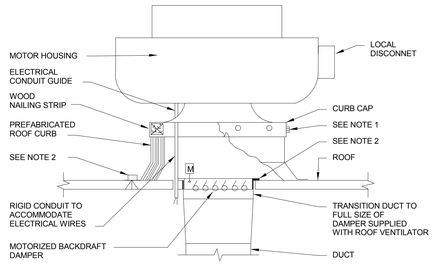
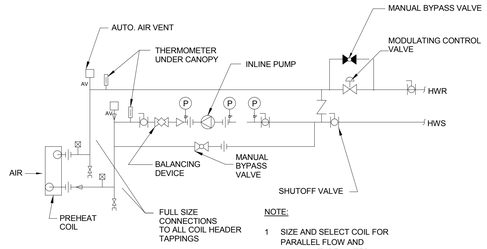


NOTE:

1. SECURE CURB CAP TO WOOD NAILING STRIP WITH 3/8" [10mm] LAG BOLTS NOT OVER 12" [300mm] ON CENTER.
2. SECURE ROOF CURB, DUCTWORK AND DAMPER TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF).
3. RUN ELECTRICAL LINES THROUGH CLEARANCE HOLE PROVIDED IN BACKDRAFT DAMPER, THEN THROUGH VENTILATOR ELECTRICAL CONDUIT GUIDE.

1B POWER ROOF VENTILATOR

NTS

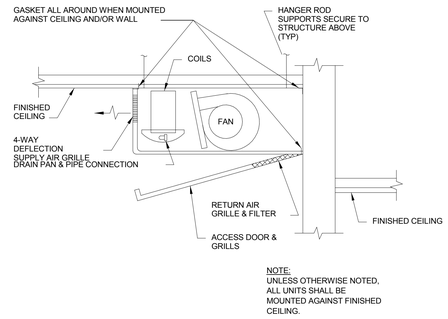


NOTE:

1 SIZE AND SELECT COIL FOR PARALLEL FLOW AND MINIMUM TUBE WATER VELOCITY OF 3.0 FEET PER SECOND

2B PREHEAT COIL (HOT WATER) - PIPING CONNECTIONS

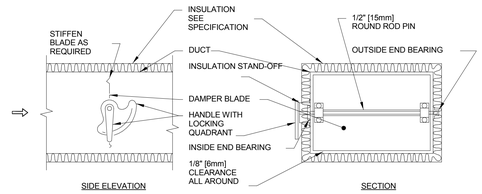
NTS



NOTE:
UNLESS OTHERWISE NOTED, ALL UNITS SHALL BE MOUNTED AGAINST FINISHED CEILING.

5B FAN COIL UNIT - HORIZONTAL EXPOSED

NTS

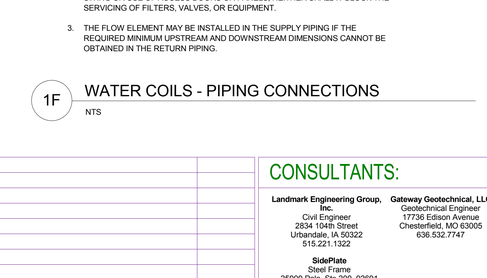


NOTE:

1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

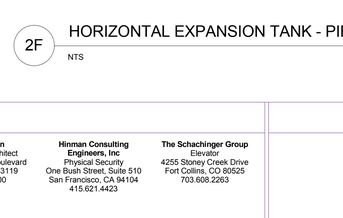
7B VOLUME DAMPER DETAIL

NTS



1D AIR COOLED CHILLER - PIPING CONNECTIONS

NTS

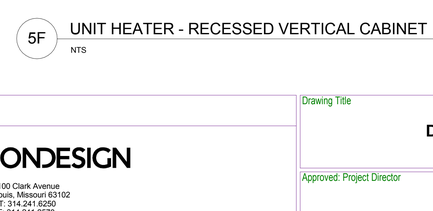


NOTES:

1. SUPPORT PUMP FROM PIPING ONLY. DO NOT SUPPORT PUMP FROM MOTOR.

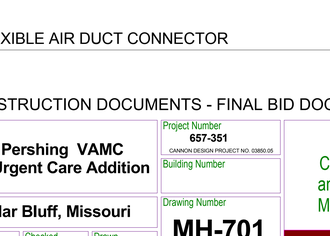
2D IN-LINE PUMPS - CONNECTIONS

NTS



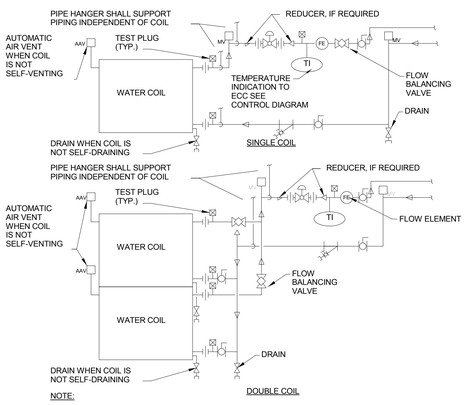
5D TERMINAL UNIT WATER COILS - PIPING CONNECTIONS

NTS



7D ACCESS SECTION FOR ROUND/OVAL DUCT

NTS

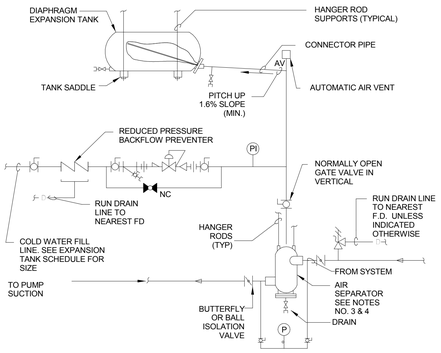


NOTE:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4" [100mm] PIPE & SMALLER. TYPE "H-P" FOR 5" [125mm] PIPE & LARGER.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.
3. THE FLOW ELEMENT MAY BE INSTALLED IN THE SUPPLY PIPING IF THE REQUIRED MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS CANNOT BE OBTAINED IN THE RETURN PIPING.

1F WATER COILS - PIPING CONNECTIONS

NTS

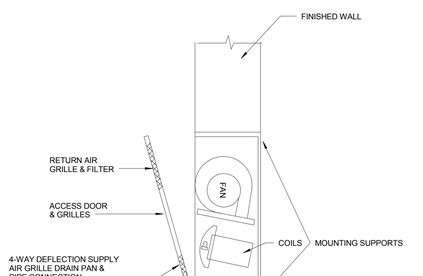


NOTES

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. RELIEF VALVE FOR CHILLED WATER SYSTEM IS SHOWN. OMIT WHEN RELIEF VALVE IS SHOWN ON HEAT EXCHANGER DETAIL & SYSTEM IS USED ONLY FOR HOT WATER HEATING.
3. PROVIDE STRAINER IN AIR SEPARATOR WHEN INDICATED IN EXPANSION TANK SCHEDULE.
4. FOR HOT WATER SYSTEMS 2" [50mm] AND SMALLER AND CHILLED WATER SYSTEMS USE IN-LINE AIR PURGER IN LIEU OF AIR SEPARATOR.
5 SET PRESSURE REDUCING VALVE SO PRESSURE AT HIGHEST POINT IN SYSTEM HAS A MINIMUM OF 4 PSIG. [28kPa]

2F HORIZONTAL EXPANSION TANK - PIPING CONNECTIONS

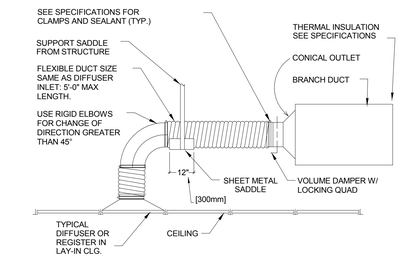
NTS



NOTES:
UNLESS OTHERWISE NOTED, ALL UNITS SHALL BE MOUNTED AGAINST FINISHED WALL

5F UNIT HEATER - RECESSED VERTICAL CABINET

NTS



7F FLEXIBLE AIR DUCT CONNECTOR

NTS

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Revisions:	Date

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Drawing Title: **DETAILS**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351** (CANNON DESIGN PROJECT NO. 03850.05)

Building Number

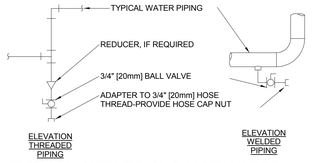
Drawing Number: **MH-701**

Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

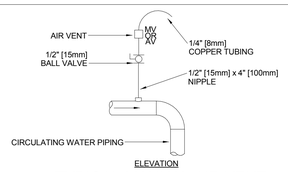
VA FORM 08-6231



TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.

2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

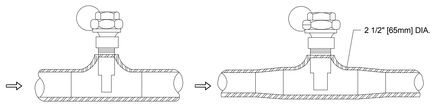


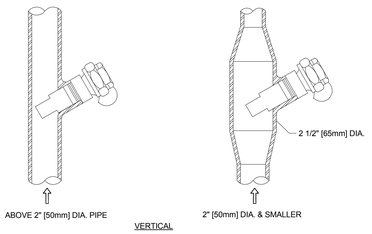
TYPICAL MANUAL AIR VENT

NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN.

DRAIN VALVE AND AIR VENT CONNECTIONS (HYDRONIC SYSTEMS)

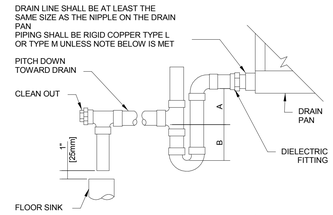
1C NTS





INSTALLATION OF THERMOMETER WELLS

3C NTS



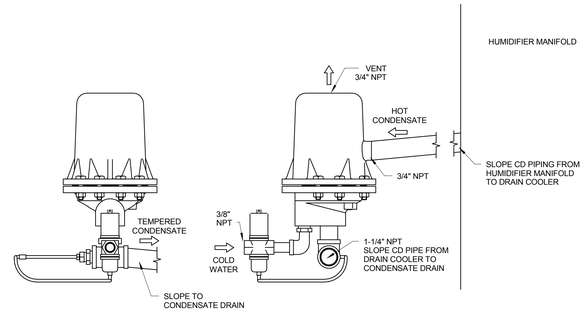
NOTE: 1. CPVC PIPE MAY BE USED ONLY IF APPROVED BY LOCAL VA AND IS INDOORS AND DOES NOT PASS THROUGH RATED BARRIERS.
2. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.

UNIT TYPE	A	B
DRAW THRU	2"[50mm] PLUS X	X
BLOW THRU	1"[25mm] MINIMUM	2X

WHERE X = STATIC PRESSURE IN PAN

AIR HANDLING UNIT DRAIN TRAP DETAIL

5C NTS



List Of Materials CC-5	
Body	ASTM A48 Cast Iron
Pipe & Fittings -Condensate -Cold Water	Malleable Iron
Body (Controller)	Brass
Sensing Bulb	Bronze

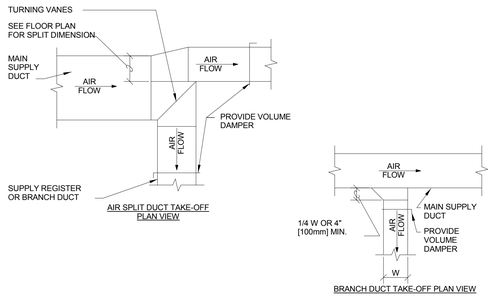
NOTES:

1. TEMPERED CONDENSATE RANGE: FACTORY SET 135°F FIELD SET 115 TO 180°F

2. CAPACITY: 5 GPM W/180°F CONDENSATE

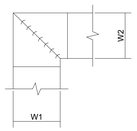
DRAIN COOLER

7C NTS



SUPPLY DUCTWORK TAKE-OFFS

1E NTS



NOTE:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.

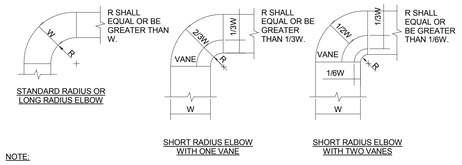
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.

3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" [50mm] RADIUS, 1 1/2" [40mm] MAXIMUM SPACE BETWEEN VANES AND A 3/4" [20mm] TRAILING EDGE.

4. WHEN W1 EQUALS W2 AND W1 IS GREATER THAN 20" [500mm] VANES SHALL BE DOUBLE VANE TYPE.

DUCTWORK SQUARE VANE ELBOWS

3E NTS



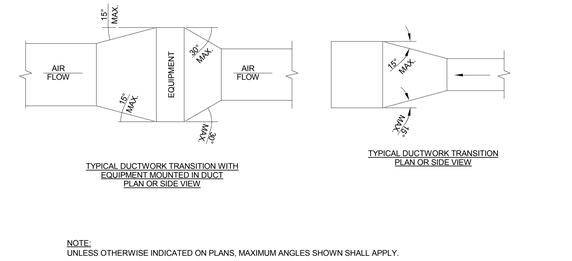
NOTE:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.

2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

DUCTWORK RADIUS ELBOWS

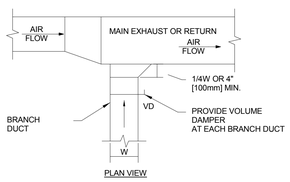
5E NTS



NOTE:
UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

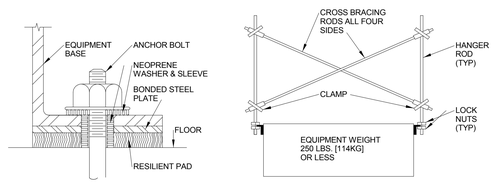
DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT)

7E NTS



EXHAUST OR RETURN BRANCH DUCTWORK

1F NTS



NOTE:
NOT REQUIRED FOR AIR TERMINAL UNITS.

SEISMIC BRACING FOR EQUIPMENT

3F NTS

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Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: **MH-702**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

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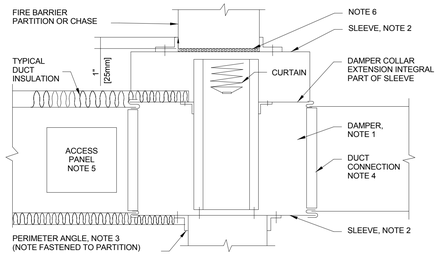
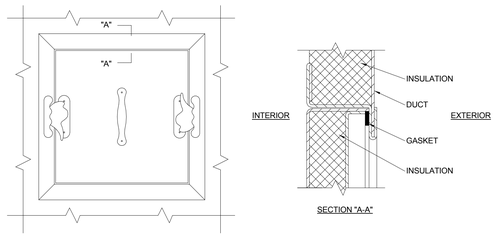


NOTE:

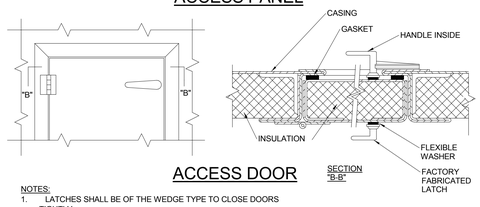
1. A VERTICAL DAMPER IS SHOWN. HORIZONTAL DAMPER INSTALLATION, IS SIMILAR. FOLLOW DAMPER MANUFACTURER'S INSTRUCTIONS, INCLUDING FASTENER OPTIONS AND GAGES FOR SLEEVE AND PERIMETER ANGLES. FIRE DAMPERS MUST BE INSTALLED IN THE PARTITION OR FLOOR AND NOT OUTSIDE THE PENETRATION.
2. GALVANIZED SLEEVE: GAGE NOT LESS THAN CONNECTING DUCT. FASTEN SLEEVE TO DAMPER FRAME AND TO PERIMETER ANGLES.
3. PERIMETER ANGLES: GALVANIZED STEEL, NOT LESS THAN 1 1/2"x1 1/2" [40x40mm], 14 GAGE, TO PROVIDE 1" [25mm] MINIMUM OVERLAP OF OPENING ON ALL 4 SIDES.
4. BREAKAWAY DUCT CONNECTION: CONTRACTOR'S OPTION OF TYPES SHOWN IN SMACNA.
5. ACCESS PANELS: SIZE AND LOCATION TO PERMIT SERVICING THE FUSIBLE LINK OR LINKS.
6. PROVIDE 1/4" TO 1/2" [6 TO 15mm] CLEARANCE ON HEIGHT AND WIDTH. FILL OPEN SPACE WITH ROCK WOOL FIRESTOP FIBER.
7. ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND MECHANICAL ROOM FLOORS, SHALL BE PROVIDED WITH 3" [75mm] HIGH CONCRETE CURB AROUND OPENING FOR DUCT.

1C SECTION THRU FIRE DAMPER INSTALLATION

NTS



ACCESS PANEL

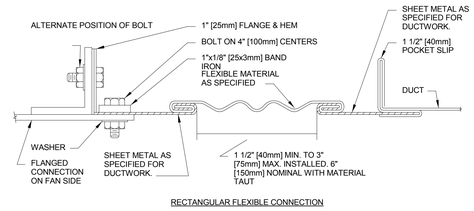


ACCESS DOOR

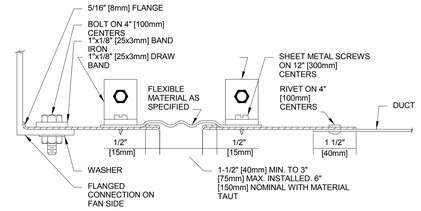
NOTES:
1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9-15

3C ACCESS PANEL AND DOOR DETAIL

NTS



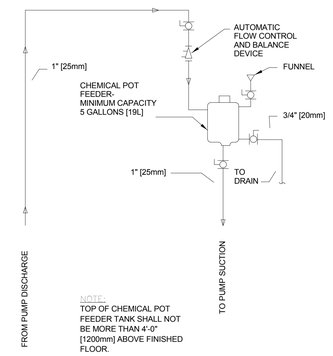
RECTANGULAR FLEXIBLE CONNECTION



ROUND FLEXIBLE CONNECTION

5C FLEXIBLE DUCT CONNECTIONS

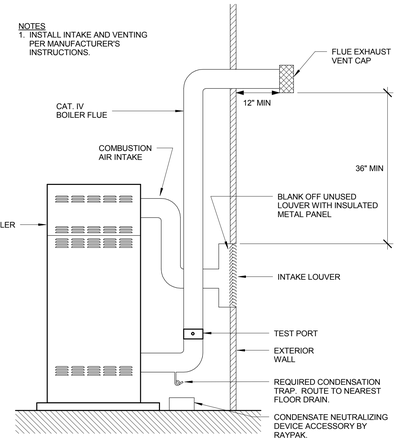
NTS



NOTE:
TOP OF CHEMICAL POT FEEDER TANK SHALL NOT BE MORE THAN 4'-0" [1200mm] ABOVE FINISHED FLOOR.

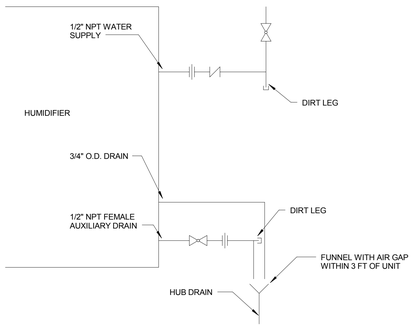
7C CHW & HW TREATMENT - CLOSED SYSTEMS

NTS



1E BOILER VENTING DETAIL

NTS



3E HUMIDIFIER PLUMBING CONNECTIONS

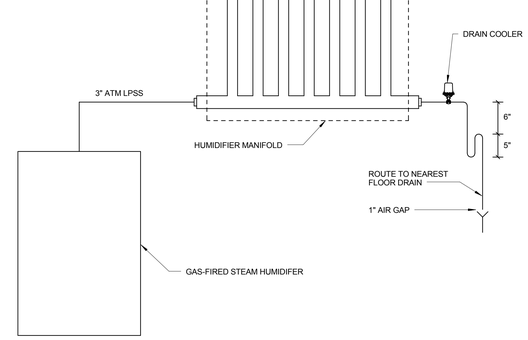
NTS

NOTES:

1. COORDINATE ALL CONNECTIONS AND SIZES WITH MANUFACTURERS REQUIREMENTS. COORDINATE WITH ELECTRICAL AND PLUMBING.
2. FLUE SHALL BE UL LISTED TYPE B DOUBLE WALL CONSTRUCTION, INNER WALL ALUMINUM, OUTER WALL GALVANIZED.
3. INTAKE AIR SHALL BE CPVC.

5E ATMOSPHERIC GAS-FIRED STEAM HUMIDIFIER

NTS



NOTES:

SEE MANUFACTURER'S PIPING RECOMMENDATIONS FOR FINAL LAYOUT

7E STEAM HUMIDIFIER - PIPING CONNECTION

NTS

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Drawing Title: **DETAILS**

Approved: Project Director

Project Title: **John J. Pershing VAMC Clinical & Urgent Care Addition**

Location: **Poplar Bluff, Missouri**

Date: **DEC 14, 2015** | Checked: **MEM** | Drawn: **BE**

Project Number: **657-351**
CANNON DESIGN PROJECT NO. 03850.05

Building Number

Drawing Number: **MH-703**
Dwg. of

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231